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GROUNDWARS 6.5 USERS GUIDE

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13. ABSTRACT (Maximum 200 words)

Groundwars is a stochastic, two-sided, event-sequenced computer simulation, which provides the results of a land duel between two forces. It models attacker movement and intervisibility based upon statistics from digitized terrain and intermittent obscurants. Groundwars models individual weapon systems and employs Monte Carlo probability theory as its solution technique. The model is primarily used to evaluate weapon system effectiveness. Groundwars can address ammunition expenditures, acquisition, delivery accuracy, vulnerability, lethality, rate of fire, disengagement policies, effect of line-of-sight due to terrain or obscurants, and the effect of various weapon classes. Version 6.5 incorporates new methodology to include Mis-ID and ID-call (target acquisition), multiple weapons and ammunition per platform, electromagnetic gun, and some new MOEs.

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User's Guide

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1. Introduction

1.1 Model Overview

- **Background**

  Groundwars is a weapon systems effectiveness combat simulation model which provides the results of a land duel between two forces. The model simulates battle at the individual weapon system level and employs Monte Carlo probability theory as its primary solution technique. The simulation is stochastic and event sequenced.

  Groundwars is an outgrowth of the TANKWARS model, version II, written in the mid 1980s by Fred Bunn of the Ballistic Research Laboratory (BRL), Aberdeen Proving Ground, Maryland.[1] The original model has been modified by AMSAA over the years to include numerous enhancements and new methodologies. As the AMSAA version grew and evolved, it was renamed Groundwars. The current version of the model is Groundwars Version 6.5.

- **Platforms**

  A total of six different platform types can be deployed between the two forces. The user determines the size of the two forces (maximum of 100 total systems), the weapon mix and performance data, the range at which the battle will begin, the attack angle distribution to be used, the terrain statistics to be used, and the atmospheric conditions. Each platform can be assigned up to three weapon types for use throughout the battle.

- **Terrain**

  Intervisibility between combatants is determined by statistical terrain data. This allows investigation of situations on a general area of terrain. One concern about results from combat simulations is that they are specific to the area of ground on which the scenario is set and to the deployment and tactics used by both sides; the conclusions which are drawn from such results may or may not be generally applicable. This, of course, can be overcome by changing the tactics, deployments, and ground; but the time implications of such a study are generally unacceptable. A statistical terrain, although developed from a set (or sets) of defender locations and attacker routes with accompanying line-of-sight (LOS) arrangements, is sampled independently for LOS opportunities during the battle and for subsequent replications, and ultimately provides a representation of the terrain's LOS opportunities. A statistical terrain model is used to generate the lines of sight which occur during the battle from empirical data, field trials, and other sources. Since data from such sources are combined across different cases in which the ground, the tactics, and therefore deployments may all be changed, the results obtained from the simulation are not restricted to a specific arrangement of forces on the area of the terrain; thus the results from Groundwars are applicable to a general type of combat (e.g., the assault of a well-prepared position) and so provide a basis for screening a large number of cases or scenarios prior to modeling a select few in more detail in a higher-level model.

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[1] F. Bunn, "THE SUSTAINED COMBAT MODEL: TANK WARS II, An Armored Combat Analysis Program," BRL Technical Report ARBRL-TR-09999, December 1985.

Four terrain distributions are incorporated into the model, representing probabilities of in-view and out-of-view LOS segments between individual defenders and groups of attackers. They can be selected by the user without requiring specific distributions to be input; they are *Eschenbach, Hunfeld, Peine (Germany),* and *Al Mafraq (SWA)* (Table 1 and Table 2). Eschenbach has choppy terrain with limited opening range and in-view lengths. Hunfeld has moderate ranges. Peine is flat and has long opening range and in-view lengths. Al Mafraq has even longer in-view lengths. *Table-top* terrain, in which defenders and attackers always have LOS, can also be chosen. The model also allows the user to input other terrain distributions if desired. Vehicles in overwatch and defenders always have line-of-sight to one another. The probabilities listed in Table 1 and Table 2 are cumulative. A random number draw between 0 and 1, U(0,1), will produce the first opening range between a given defender and attacker, using Table 1. Additional U(0,1) draws will produce in-view and out-of-view segment lengths in meters for the same defender/attacker pair using Table 2.

Table 1: Opening LOS Range Distributions

Opening LOS Range (Range at First LOS)			
Eschenbach		Hunfeld	
Range	Probability	Range (M)	Probability
0	.000	0	.000
1000	.113	1000	.073
2000	.444	2000	.290
3000	.709	3000	.619
4000	.803	4000	.866
5000	.926	5000	.950
6000	.962	6000	.985
7000	1.000	7000	.993
		8000	.999
		9000	1.000
Peine		Al Mafraq	
Range	Probability	Range (M)	Probability
0	.000	0	.000
1000	.000	500	.005
2000	.055	1000	.020
3000	.317	1500	.025
4000	.660	2000	.040
5000	.836	2500	.120
6000	.917	3000	.220
7000	.965	3500	.310
8000	1.000	4000	.390
		4500	.540
		5000	1.000

Table 2: LOS Probability Distributions

In-LOS and Out-of-LOS Probability Distribution					
Eschenbach			Hunfeld		
Segment Length (M)	In	Out	Segment Length (M)	In	Out
0	.000	.000	0	.000	.000
100	.211	.117	100	.158	.141
200	.370	.186	200	.280	.239
300	.513	.247	300	.379	.320
400	.617	.308	400	.469	.380
500	.703	.369	500	.543	.441
600	.767	.414	600	.589	.485
700	.815	.458	700	.638	.518
800	.853	.495	800	.669	.544
900	.878	.522	900	.705	.567
1000	.898	.543	1000	.740	.588
1500	.954	.653	1500	.871	.671
2000	.981	.744	2000	.950	.747
2500	.994	.791	2500	.979	.796
3000	.997	.861	3000	.993	.846
3500	.999	.902	3500	.997	.879
4000	1.000	.929	4000	.999	.915
4500	1.000	.942	4500	.999	.936
5000	1.000	1.000	5000	1.000	1.000
Peine			Al Mafraq		
Segment Length (M)	In	Out	Segment Length (M)	In	Out
0	.000	.000	0	.00	.00
100	.118	.136	500	.59	.61
200	.188	.209	1000	.77	.76
300	.245	.274	1500	.86	.84
400	.295	.336	2000	.92	.89
500	.340	.349	2500	.96	.92
600	.379	.417	3000	.98	.95
700	.417	.444	3500	1.00	.97
800	.442	.470	4000	1.00	.98
900	.471	.488	4500	1.00	.99
1000	.499	.507	5000	1.00	1.00
1500	.648	.615			
2000	.742	.685			
2500	.828	.744			
3000	.868	.793			
3500	.908	.824			
4000	.935	.835			
4500	.947	.852			
5000	1.000	1.000			

- **Acquisition**

  Given that intervisibility exists between two combatants, one may acquire the other. An observer may acquire a target either by normal search or by detection of the target's firing signature. Normal acquisition is based on the *Night Vision Electronic Sensors Directorate (NVESD)* target detection routines, and is a function of the sensor, the atmosphere, the target, and range. An observer may also detect a target's firing signature. Whenever an enemy system fires, there is a probability that the observer will detect it. If this probability is met, the observer begins engagement of the target after a random period of time which is sampled from a distribution generated from test data.

- **Weapons**

  Four types of rounds can be played in the model: *kinetic energy (KE), high explosive anti-tank (HEAT), anti-tank guided missiles (ATGM),* and *fire and forget missiles (FAF).* For each weapon the model requires system characteristics (firing times, times of flight, reliability), accuracy data, and vulnerability data.

- **Target Engagement**

  Three types of target engagements can be played in the model. The first is single target engagement in which a firer detects a target, begins engagement of the target, and discontinues all other actions. The second type allows the firer to detect a target and begin engaging, and to concurrently search for additional targets. Once the firer disengages the first target, he will select the next target from his list and begin engaging the next target. The third type of engagement can only be played with fire and forget missiles. In this type of engagement, the firer attempts to queue a number of targets, and then fire a single shot at each of the queued targets nearly simultaneously.

- **Countermeasures**

  A number of countermeasures can be simulated. These include smoke grenades, laser warning receivers (LWR), an Active Protection System (APS), and artillery-delivered smoke. When an on-board grenade system detects an incoming round, it can launch grenades around the vehicle and form a cloud of smoke which may cause incoming missiles to abort. An APS can sense an incoming round and either destroy, jam, or degrade an incoming projectile. The user may control the level of effectiveness for these self-defense systems. Artillery delivered smoke can also be played on the battlefield to degrade acquisition capabilities.

- **Artillery**

  Limited artillery play is also implemented in the model. Each side can deploy one on-call mission during a battle, and the attacking force is given the option to have one preparatory artillery barrage. For each type of mission, there is an associated probability of kill which is assessed against enemy vehicles. On-call artillery missions occur at random times in the battle.

- **Disengagement**

  Groundwars allows the user to choose from two optional disengagement tactics. A firer will always disengage a target after the target is catastrophically killed. One optional tactic is to disengage a target after hitting it. Another is to fire a certain number of rounds at a target and then disengage. For these optional tactics, the model allows a firer to return to a serviced target if he hasn't found another target after a period of time.

- **MOEs**

  The primary measures of effectiveness for the simulation are loss exchange ratio (LER -- mean RED dead divided by mean BLUE dead), mean casualties (systems which are fire-power killed or worse), system exchange ratios (LER for individual platform types), and average losses as a function of time in the battle. The secondary measures include surviving force ratio, shots, hits, and kills for each weapon-target pairing, and average detections by each sensor. The amount of output is directly controlled by the user, and can range from averages to a detailed break down of many facets of the battle.

- **Uses**

  Groundwars can provide a trade-off analysis between major weapon system characteristics such as fire control, vulnerability, and accuracy. It can provide analysis for a number of combat related issues (i.e. terrain, atmospheric conditions, attack angles). The effects of changes in target acquisition, target disengagement policy, and ammunition storage can be shown relatively quickly and easily.

- **Limitations**

  Groundwars is used primarily for direct-fire weapon systems studies. It does not model helicopters, mines, or dismounted infantry. Although both prep and on-call artillery can be played, the model should not be used for a study whose emphasis is on indirect-fire analysis.

- **Runtime**

  A major attribute of Groundwars is its quick set-up and run time which allows for examination of many situations and conditions. The sample battle of 6 RED vs 4 BLUE shown later in the document took about 3 minutes to run 3000 replications on a PC. The model provides a basis for modeling system interactions and can enable an analyst to obtain a good understanding of these effects prior to large scale combined arms modeling.

1.2 Version 5.3 Model Enhancements

The following list provides an overview of the model enhancements made to version 5.3, from version 5.0:

- **ACQSIM Draw** - Based on the recommendations of the AMSAA/TRAC-WSMR Joint Working Group on Methodologies in Combat Simulation Models, the P-Infinity *ACQSIM Draw* methodology was recently implemented in the Groundwars model, replacing the older *Opportunity Draw* methodology.

  The NVESD (Night Vision Electronic Sensors Directorate) ACQUIRE model target detection algorithms used in Groundwars calculate *P-Infinity* and *T-Bar* (mean time to detect) based upon sensor, atmospheric conditions, and target characteristics. *P-Infinity* can be defined as the probability of detection given an infinite amount of time.

  In Groundwars, upon opening line-of-sight, acquisition capability is determined by drawing a uniform [0,1] random number and comparing it to the calculated P-Infinity. If the random number is less than P-Infinity, the target can be detected by the observer, and a time to detect is calculated based upon the value of T-Bar.

The older *Opportunity Draw* methodology consisted of testing a new random number draw against the value of P-Infinity for every opportunity (i.e., new line-of-sight opening between observer and target). This methodology misapplied the P-Infinity probability by repeatedly drawing random numbers until, in effect, the P-Infinity test succeeds.

The *ACQSIM Draw* consists of drawing a uniform[0,1] random number at the beginning of the replication for each observer and assigning it to that observer for the duration of the battle. The observer's random number is used for all P-Infinity tests for that observer for the duration of the battle.

- **Wide and Narrow Field-of-View (FOV) Search** - Changes were implemented to simulate the play of both wide FOV (WFOV) and narrow FOV (NFOV) search; that is, to simulate an observer searching for targets in WFOV, and, when a target is WFOV-acquired, the observer switching to NFOV and attempting to find the target in NFOV. Previously, Groundwars allowed only one FOV for search and engagement.

- **Ranging-In** - *Ranging-in* is a process used by gunners to adjust fire on the target. The range-in process lowers accuracy errors for weapon systems with limited fire control since the gunner must correct for errors associated with target range estimation, system biases, etc. The gunner achieves more accurate fire by adjusting the aimpoint in response to the perceived impact location of the preceding round. Groundwars now allows ranging-in to be simulated for burst-fire weapons.

- **Javelin** - Groundwars can now simulate a lock-on-before-launch system like *Javelin*. See the *Weapon Input File* descriptions for further information.

- **Burst-Fire** - Fixes to the burst fire code now allow separate burst-fire rounds to be simulated, as well as adding the capability to input a different variable bias for subsequent burst delivery accuracy. Also, ranging-in capability has been added as described above.

- **Hunter-Killer** - Groundwars allows simulation of the *Hunter-Killer* capability by allowing a system to detect up to an input specified number of targets concurrently, simulating the effect of a gunner engaging one target while a commander continues to search for another. Previously, Groundwars only modeled one FOV capability for the search and engagement process, and the first acquired target was passed immediately to the gunner for engagement while the commander then continued searching. With the new wide and narrow FOV search in Groundwars, Hunter-Killer is modeled by having the commander acquire a target in WFOV, then pass this information to the gunner, who then proceeds to search, re-acquire, and engage for the target in NFOV. Meanwhile, the commander can search in WFOV for another target.

- **Communication** - In Groundwars, this refers to inter-vehicular communication, i.e., communication among vehicles on the same force for the purposes of sharing target location information. With the new wide and narrow FOV capability in the model, communication is modeled as follows: When an observer acquires a target in WFOV, the observer transmits the target location to all other friendly systems. The original observer and all receiving systems will then attempt to acquire the target in NFOV before proceeding to engage. (Note: The only way to govern the distribution of fire once the information is passed is to increase or decrease the time to wait (input variable described below) before the receiving vehicle will react.) One set of values per force for the following is input and applied to each unit in that force for the following:

    - probability of receiving a transmission of target location,

    - time to wait before the receiving vehicle will conduct its field-of-view search, and

- length of time the receiving vehicle will search in its field-of-view before renewing normal search.

- **Active Protection System (APS)** - Degradation factors (affecting lethality of incoming rounds) may now be input by range (from firer to target with APS) and by vehicle exposure (hull defilade or fully exposed).

- **Attack Angle Distributions** - Some errors in the third decimal place have been corrected.

- **Terrain** - An additional statistical terrain is now user-selectable within the model. It is *Al Mafraq*, a Southwest Asia terrain with very long lines-of-sight.

- **Rounds Consumed Per Enemy System Killed** - A new Measure of Effectiveness has been added to Groundwars. *Rounds Consumed per Enemy System Killed* is now included in the model. This MOE is a measure of rounds-fired plus rounds-stowed-that-are-lost- when-a-system-is-K-Killed divided by enemy-systems-killed. The MOE is reported by platform type.

- **Radar** - A correction to the radar acquisition routine was made which affects the calculation of the signal-to-noise ratio.

- **Debug Flags** - Three more debug flags (to total 33) have been added to handle *NFOV-acquisition, lock-on-before-launch,* and *Range-in* events.

- **Bug Fixes** - A number of bugs which caused run-time errors were fixed involving the *disengagement, target selection, print acquisition, acceleration,* and *deceleration* routines.

1.3 What's new in Version 6.5

The following list is a summary of enhancements made to the model since version 5.3.

- **Multiple Weapons/Ammunition per Platform** - Any vehicle (or platform) may now fire up to three different weapon types (e.g., firing a missile at long range, a cannon round at medium range, and a machine gun at close range). This will also allow a mix of ammunition types. The user must now create a decision table for each force which specifies the priority of weapon system selection that a unit will use to determine which weapon it will fire at a given target type. The priority list must be specified for three different range bands for each weapon/target combination.

- **Range Increment by Weapon Type** - Many of the performance data are input by range increments. For example, delivery accuracy may be input at ranges of 500, 1000, 1500 meters, etc. In previous versions of Groundwars, this range increment was specified in the game file and was applied to all units on both sides in the scenario. With the new play of weapon system mixes per platform, it becomes even more important to be able to use different range increments to input data for different weapons. The **Range Increment for Input Data** is now specified for each weapon system in the weapon file. Note: For target acquisition (and including combat identification devices) input, the *Rginc-Out* variable as specified in the game file is used for all units.

- **Free Formatted PKH Vulnerability File Input** - In order to decrease the chance for errors when creating Vulnerability Files for Groundwars' use, The *Probability of Kill Given a Hit* data from an IUA-style file is now read by the model in free format.

- **PKS Input File Range Specifications** – The number of lines of input for each exposure condition is now input at the beginning of the PKS File, just before the PKS values. This value should correspond to the number of ranges for which PKS values are input.

- **Micro-Timeline for Losses and LERs** – The model will now allow the user to specify smaller increments of time (in seconds) to report the average BLUE and RED losses and average LER in the output table. For typical battle durations of 20 minutes, losses and LERs can be reported at 10 second intervals. For 2 minutes of battle, 1-second intervals may be used.

- New Target Acquisition Methodology –

  - **Line Pair Criteria** – The recommended values of the Johnson Line Pair Criteria, n50, used to define various levels of target discrimination, has been revised.

  - **Mis-Identification** – Methodology to allow an observer to mis-identify a target (identify the target incorrectly) has been added. Target mis-identification (mis-ID) is an important consideration during investigation of fratricide and combat vehicle target identification (Combat ID) technologies.

  - **ID-call** – As part of the new mis-ID methodology, this represents the point at which an observer makes an ID declaration (correct or incorrect). An additional line-pair input must be specified for this in the game file.

  - **Time to Find a Target in Narrow Field of View (NFOV)** – Once a target is acquired in Wide Field of View (WFOV), the observer changes to Narrow Field of View (NFOV), and attempts to find (i.e., ID, recognize, classify, etc.) the target. Instead of using the ACQUIRE equations to calculate how long this takes, a nominal time of three seconds is applied. The input variable *tnfov* in the sensor file is no longer needed.

- **Combat Identification (CID) Constant Emitter Methodology** – The methodology for CID devices which are classified as *Constant Emitter* (CID File 1 in Groundwars) has been changed so that the CID signal check is done just prior to the gunner firing, instead of just after target detection in WFOV.

- **Electromagnetic Gun (EMG) Methodology** – This allows the simulation of a kinetic energy round which is propelled by electromagnetic energy. New inputs for this are contained in the Weapon File.

- **Bug Fixes** – A number of bugs were fixed involving missile firings. Also fixed were problems encountered reading comment lines in the routine which reads input from the PKS file.

The following input files have changed their format since version 5.3:

- **Game File** - The line specifying the Range Increment for Input has been deleted. The number of line-pairs for ID-call is now input.

- **Weapon File** - The Range Increment for Input is now specified for each weapon system separately. An input (T or F) is specified to indicate whether an EM Gun is being played. If an EM Gun is played, additional values must be input describing the time to generate one firing stored energy, and the maximum energy storage possible.

- **Unit File** - Up to three weapon system names are now specified for each unit instead of one. Each one may represent either a separate weapon system on the unit, or a separate type of ammunition.

- **Priority File** - This is a new input file. Each force must have one of these files which contains a

decision table which specifies the priority of weapon system selection by range-band that a unit will use to determine which weapon it will fire at a given target type.

- **Vulnerability File** - Although no format change is necessary in the PKH file, the model will now accept free-formatted lines. If PKS (PK Flag = 2) input is used, the number of ranges contained in the file for each exposure must be input.

- **Sensor File** – The *tnfov* input is now omitted.

2. Input Data Requirements

The program has been released with certain limits on the number of units in a battle (100) and the number of different vehicle, weapon and sensor types which can be played (6). These limits may be modified and the model recompiled, but some additional modifications may be needed within the program to achieve this.

Groundwars requires input files describing the scenario and weapon system performance for each side. There are a total of 14 different file types, 9 of which are required, with 5 being optional depending on the scenario desired. There may be more than one file needed for a given type, depending on the number of units or weapon types played. At a minimum, with only one weapon type played on each side, (and no smoke, ranging-in, or fratricide/CID played), 19 input files would be required: one *game* file and nine file types for each side.

Table 3 lists the names of all of the required and optional Groundwars input files with a brief description of each type. All of the required file types, except the game file, need at least one entry for both the BLUE side and the RED side (filenames begin with b and r, respectively). This is also the case for the optional range-in files.

Table 3: Groundwars Input Files

File names	Description
Required	
`game`	Scenario and game control information.

`bacc1` `racc1`
`bacc2` `racc2`
: `racc3`
: :
	Delivery accuracy. One for each weapon system.

`bpk1` `rpk1`
`bpk2` `rpk2`
: `rpk3`
: :
	Vulnerability files. One for each weapon/target pairing.

`bsens` `rsens`	Sensor device performance.
`bunit` `runit`	Unit type defs, force size, location.
`bveh` `rveh`	Vehicle (platform) definitions, performance.
`bweap` `rweap`	Weapon system definitions, performance.
`barmy` `rarmy`	General information for each army.
`bprio` `rprio`	Weapon/target priorities by range.
Optional	
`smkfile`	Smokefile. List of obscuration events, effects.
`engfile`	Who can engage whom (e.g., fratricide).
`cidfil1`	Combat ID performance descriptions (constant emitter).
`cidfil2`	Combat ID performance descriptions (query-response).
`brng1` `rrng1` : `rrng2` : :	Range-in performance. One for each weapon system if needed.

The *game* control file determines the scenario, the terrain, and the level of output desired. This file also determines the attack angle distribution, the visibility conditions, etc.

For each army there must be a *unit* deployment file in which the number of units, the starting locations of the units, and the function of the units in the battle is set. An *army* file describes force characteristics such as disengagement tactic, artillery lethality, and decoys for each army. Each side must have a file which describes its *vehicles*, one for its *weapons*, and one for its *sensors*. For each weapon system there is an *accuracy* file, and for each weapon-target pair there may be a *vulnerability* file. If artillery delivered smoke or other obscurants are to be played, a file is required to characterize the periods and levels of *obscuration*. If fratricide and combat identification (CID) are played, additional files are required which describe *engagement* rules and *CID* effectiveness.

All files are free formatted. Comment lines may be added to the top of any input files by starting the line with an asterisk (*). Any lines shown in the documentation are there for clarity and the program expects them to be there. They may be changed, but cannot be deleted. Data which are entered as character strings can be a maximum of seven letters long and can include capital or small letters (longer strings will be truncated to seven letters). All times which are entered into the data files are in seconds, and all linear measurements (dimensions, speed, etc.) are in meters.

The program searches for all of its input files in the current working directory. All input files which are needed for the battle must be assembled into the current directory prior to execution of the program. The program requires input files with specific names. These names will be explained in the specific input sections.

2.1 Game File

This file defines the scenario to be played and controls the level of output. The file must be named *game* in the current working directory for the program to read it. The general structure of the file is shown in Table 4. Table 5 lists Game File input variable definitions. Table 6 lists available attack angle distributions the user may select in the game file. Table 7 shows a sample game file. Table 8 lists output control flag options. Table 9 shows the input structure of user defined terrain input data.

Table 4: Game File

Line	
0	** Comment Line(s)
1	Scenario: RED Attack, BLUE Attack, STATIONARY Engagement
2	Terrain: Eschenbach, Hunfeld, Peine, Al Mafraq, Table-top, Other
3	Attack Angle Distribution: Cardioid, Frontal, CV-CPOA, Close Combat
4	Atmospheric Visibility Range, Optical Attenuation, Thermal Attenuation
5	Output Control Flags (7)
6	Program Debug Flags (33)
7	Maximum Battle Time in Seconds
8	Increments for Output Tables: Time, Range
9	Maximum Number of Replications, Initial Random Seed
10	Pinpoint Restriction Flag, ID-call Line-Pairs
11	Statistical Confidence Level, Relative Width
12+	User specified terrain distributions (only input if "Other" on line 2)

Table 5: Game File Input Definitions

Table 5: Game File Input Definitions		
Line	Variable	Definition
1	Scenario	Type of Engagement (Character String) [RED Attack, BLUE Attack, STATIONARY Engagement]
2	Terrain	Statistical terrain distribution for the model to use to generate line-of-sight during play *[Eschenbach, Hunfeld, Peine, Al Mafraq, Table-top, Other]*. If "Other" is selected, the user must input additional lines describing the user-specified terrain. See line 13+ description below for further information. (Character String)
3	Attack Angle Dist	Identification of what distribution is to be used when sampling to determine the angle of impact in the horizontal plane for an incoming round (Character String). See Table 6 for a list of the available distributions. *[Cardioid, Frontal, CV-CPOA, Close Combat]*.
4	Vis Range	Atmospheric Visibility Range in km. Used along with other input to determine target acquisition capabilities during the battle.
	Optical Atten	The corresponding atmospheric attenuation coefficient for optical transmission.
	Thermal Atten	The corresponding atmospheric attenuation coefficient for thermal transmission.
5	OFlags	Output Control Flags. These seven integers determine the detail and amount of output generated for a battle. If all flags are set to zero, only the summary statistics representing the averages of the replications run for the case will be listed. The output generated by setting flags to non-zero values are shown in Table 8. For example, setting flag two to the value of one or two causes an echo of some of the weapon system characteristics inputs to help the user check for input errors. Analysis of acquisition capabilities can be aided by listing acquisition probabilities and time estimates as a function of range for each sensor/target pairing (flag three).
6	DFlags	Program Debug Flags. This line contains 33 flags which enable printing of many variable values as the model executes. These are intended for debugging purposes. They should not be set greater than zero for more than one replication, as they produce a lot of output.

Table 5: Game File Input Definitions		
Line	Variable	Definition
7	Max Time	Maximum Battle Time in Seconds. This time will be used to end the battle unless all combatants on one side are dead or non-functioning. Note: When playing an attack/defense scenario, do not input a maximum battle time which allows the attacking force to over run the defenders, and continue past them. This will probably cause a runtime error. (The attacking force's movement rate is input in the vehicle file. Each army's initial deployment location is input in their respective unit deployment files.)
8	Time Inc	Increments for Output Tables by Time. This variable allows the user to control the output of certain measures of effectiveness which are recorded and reported as a function of time (sec). Included MOEs are average RED and BLUE losses and exchange ratio.
	Rginc-Out	Increments for some Output Tables by Range. This variable allows the user to control the output of certain measures of effectiveness which are recorded and reported as a function of range (in meters). Included MOEs are acquisition events. Shot, hit, and kill output tables are listed by *Rginc-In) specified in the weapon files.*
9	Max Reps	Maximum Number of Replications. Since Groundwars is a monte carlo model, a number of replications must be run to achieve a certain level of confidence in the output (see line 12 below). Typically, 300 to 500 replications are sufficient for most studies, depending on the total number of combatants played. This input number of replications will be used only if the desired level of statistical confidence has not been reached by this point (see line 12 below).
	Ran Seed	Initial Random Seed. An integer is needed for use as a seed for Groundwars' random number generator. For example, 12345678.
10	Pinp Rflag	Pinpoint Restriction Flag. The ability of an observer to detect a target's firing signature (pinpoint) can be restricted by this input. Setting this flag to zero allows observers to detect firing signatures regardless of their ability to detect the same target (given its range, etc.) by normal search. Setting the flag to a value of one restricts the observers' ability to pinpoint a target to those situations in which the calculated value of P-Infinity (based on the sensor, target, atmosphere, and current range) is greater than zero.

Table 5: Game File Input Definitions		
Line	Variable	Definition
	ID-Call Line-Pairs	The number of line-pairs (n50 johnson Cycle Criteria) representing the point at which an observer makes an ID (target identification) declaration (which may be correct or incorrect). [Note: At the time of this user's guide preparation, the AMSAA-recommended value for ID-call is 5.0 line-pairs.]
11	Conf Level	Statistical Confidence Level. This is for the desired confidence level for the output RED and BLUE dead, and Exchange Ratio. Along with the next input, relative width, they are used to terminate the simulation if the desired level of confidence has been reached. The model records the results from each of the replications and calculates the mean and standard deviation for all preceding replications. If the results meet the statistical criteria which the user sets for all three of the above measures of effectiveness the model terminates execution. The user specifies the level of confidence (80.,90.,95., 98.,or 99.) and the relative width (see below).
	Relative Width	Specifies the desired coverage of the calculated mean with respect to the true mean of the distribution. Usually between .05 and .15. For example, if the user specified 95 percent confidence and a .05 for the relative width, then one can be 95 percent confident that the true mean of the distribution is within 5 percent of the displayed mean.
13+	[User Terr Dist]	Only input if "Other" is specified on line 2. If a user defined terrain is being used, an additional section to the file must be input here. For intervisibility, the model first finds the range at which line of sight first opens; this occurrence is characterized by the first opening range distribution. Once the initial opening range is found, the model draws alternating in and out of view segments of varying lengths. The lengths of these segments are drawn from two additional distributions. The format for entering the three distributions, first opening range, in-view segment lengths, and out of view segment lengths, is shown in Table 9. Note the probability distributions are cumulative and the values for the longest ranges must be 1.0.

Table 6: Attack Angle Distribution

Cardioid		Frontal		Close Combat		CV-CPOA	
Angle	Prob	Angle	Prob	Angle	Prob	Angle	Prob
0.	.0000	0.	.0000	0.	.0000	0.	.0000
25.	.1365	15.	.2925	15.	.1250	15.	.1815
45.	.2370	45.	.4650	45.	.1900	45.	.3040
75.	.3620	75.	.4925	75.	.2350	75.	.3790
105.	.4460	105.	.5000	1.5	.3650	105.	.4525
135.	.4880	255.	.5000	135.	.4100	135.	.4810
165.	.5000	285.	.5075	165.	.4650	165.	.4945
180.	.5000	315.	.5350	180.	.5000	180.	.5000
195.	.5000	345.	.7075	195.	.5350	195.	.5055
225.	.5120	360.	1.0000	225.	.5900	225.	.5190
255.	.5540			255.	.6350	255.	.5475
285.	.6380			285.	.7650	285.	.6210
315.	.7630			315.	.8100	315.	.6960
335.	.8635			345.	.8750	345.	.8185
360.	1.0000			360.	1.0000	360.	1.0000

Table 7: Game File Sample

```
** Sample Game File
red attack              *scenario description
Peine                   *terrain specification
cv-cpoa                 *attack distribution
7.0 .69 .42             *visibility range, optical, and thermal attenuations
1 0 2 0 0 1 0           *output control flags
33*0                    *debug flags
852.                    *max battle time
60. 500.                *output increments: time, range
500 11111111            *nreps, initial seed
0   5.0                 *pinpoint restriction, ID-call line-pair
95. .05                 *confidence level, relative width
```

Table 8: Output Control Flags

Flag	Input	Description
1	1	Normal output plus a one line summary of each replication
	2	Normal output plus a detailed account of all critical events in the battle (Do not run more than a few replications)
2	1	Output of weapon system characteristics (round type, firing times, reliability, etc.)
	2	Sample of vulnerability data for each weapon/target pairing
3	1	Output of acquisition estimates for each sensor
	2	Output of acquisition estimates for every change in atmospherics caused by artillery smoke
4	1	Trace entry and exit from important routines (Do not run for more than a few replications)
5	1	Output all events as they are scheduled and canceled (Do not run for more than a few replications)
6	1	Output of killer-victim scoreboards by range
7	1	Output of distribution of shots for each weapon type

Table 9: User Defined Terrain Statistics Input

Line	
1	`Number of points in In-View and Out-of-View distributions, Number of points in Opening Range distribution`
2	`Range1 Probability1 (of Opening Range at Range1)`
3	`Range2 Probability2 (of Opening Range at Range2)`
:	`:  :`
n	`RangeN  1.0`
n+1	`Range1 Probability1 (In-View) Probability1 (Out-of-View)`
n+2	`Range2 Probability2 (In-View) Probability2 (Out-of-View)`
:	`:  :  :`
n+m	`RangeM  1.0  1.0`

2.2 Unit Deployment File

The force size, the location, the exposure and the type of combatants for each army are defined in the unit deployment file. Within this file are specified the names of the vehicles, weapons, and sensors which will be used in the simulation. These names are important, as they will be used throughout the other data files. Each army has a unit deployment file which must be named *bunit* for BLUE and *runit* for RED. The structure of these files is shown in Table 10. Table 11 shows the input variable definitions for it.

Table 10: Unit Deployment File

Line	
0	** Comment Line(s)
1	* unit num type of exp loc vehicle weap1 weap2 weap3 sensor
2	* name combatant name name name name name
3	COMPANY 2 Defender HD 4000. BRAD TOW2 30MM NULL ANTAS
4	RECON 4 Defender HD 4500. HMMWV COAX WEP2 NULL ANTAS
5+	: : : : : : : : : :

Table 11: Unit Deployment File Input Definitions

Variable	Definition
Unit Name	Used to distinguish combatants of this unit type from those in other unit types. A unit type is defined by combatant type, exposure, initial location, vehicle type, weapon type, and sensor type. All output will be shown in reference to these unit names.
Number	The number of combatants of this unit type.
Tcombat	Type of combatant. *[Defender, Attacker, or Overwatch]*
Exposure	The exposure of the units is either hull defilade (HD) or fully exposed (FE). Both defending and overwatch units are stationary, and can be either HD or FE. Defenders will begin firing upon detection whereas units in overwatch can deploy the tactic that they will not engage until an enemy vehicle has begun the battle (overwatch tactic is set in the army file). Attackers are moving, and should be fully exposed. For a stationary engagement both forces are stationary; one force will consist of all defenders, and the other will be all overwatch. For an attack scenario, the attacking force will consist of attacker units and overwatch units against defending units.
Location	This is the location of these units on the battlefield in meters. Because of the way the model keeps track of the units, attackers move in the positive direction. For example, if the battle is a BLUE attack and the initial battle range is 4000 meters, the RED defense would be placed at 4000. and the BLUE attackers would be started at 0 meters. Overwatch units can be placed at any range.
Vehicle Name	A seven-character or less vehicle type identification. These names will be used in the other input files and the names must match. The different vehicles, weapons, and sensors can be mixed between the different units.
Weapon Name1 Weapon Name2 Weapon Name3	Three seven-character or less weapon type identifications. These names will be used in the other input files and the names must match. The different vehicles, weapons, and sensors can be mixed between the different units. Less than three weapons per unit can be specified by using "NULL" for a weapon name.
Sensor Name	A seven-character or less sensor type identification. These names will be used in the other input files and the names must match. The different vehicles, weapons, and sensors can be mixed between the different units.

2.3 Vehicle File

The vehicle files contain data which describe system platforms. The file describes such characteristics as the physical size and the speed of the vehicles. For each army there is one vehicle file which contains a subsection for each vehicle in that army. The BLUE vehicle file is called *bveh*, and the RED file is called *rveh*. Each subsection has the same structure, and the subsections can be entered in the file in any order. The vehicle names used in this file must agree with those specified in the unit deployment file.

Table 12 shows the structure of the vehicle subsection. Each subsection can begin with description or comment lines to denote what this vehicle is (e.g., **** M1A1 **** or **** M1A1 with 20 percent signature reduction*). The lines in the sample which begin with "-" must remain in the file or an error will result. They are included to help the user when entering the data. Table 13 list the vehicle file input variable definitions.

Table 12: Vehicle File

```
Line
 0  ** Comment Line(s)
 1  Vehicle Name
 2  --Turret dimensions: Height 1/2 Width Length: Front Back
 3                       x.x    x.x              x.x   x.x
 4  --Hull dimensions: Height 1/2 Width Length: Front Back
 5                     x.x    x.x              x.x   x.x
 6  --Tgt Acq data: Hull Defilade Fully Exposed
 7                  x.x           x.x          *Optical Contrast
 8                  x.x           x.x          *Thermal Contrast
 9                  x.x           x.x          *Characteristic Dimension
10                  x.x           x.x          *Radar Cross Section
11  --Movement: max speed acceleration deceleration Pause-in-Def
12                x.x      x.x          x.x             x
13  --Times to Leave the Battle: Jockey When Empty When F-Killed
14                               xx.x     xx.x       xxx.x
15  --Active Protection: Arc of Protection Number of Launches
16                           xx.x              xx
17        --Num Ranges
18            x
19          Weapon Name
20          --Hull Defilade
21          -- P(Det) P(fire)/hit P(fire)/miss P(intercept)
22              x.xx    x.xx          x.xx          x.xx
23          -- Range Degradation Factors: 0 30 60 90 120 150 180
24             range1 x.xx x.xx x.xx x.xx x.xx x.xx x.xx
 :                :     :    :    :    :    :    :    :
32             rangeN x.xx x.xx x.xx x.xx x.xx x.xx x.xx
33          --Fully Exposed
34          -- P(Det) P(fire)/hit P(fire)/miss P(intercept)
35              x.xx    x.xx          x.xx          x.xx
36          -- Range Degradation Factors: 0 30 60 90 120 150 180
37             range1 x.xx x.xx x.xx x.xx x.xx x.xx x.xx
 :                :     :    :    :    :    :    :    :
45             rangeN x.xx x.xx x.xx x.xx x.xx x.xx x.xx
46        END
47  --Smoke Grenades: Ngren P(Launch) alpha-CLs Time to Deploy Duration
48                      xx    x.x      x.x x.x x.x     xx.x          xx.x
49  --Laser Warning Recvr: On/Off P(det) Pop-smoke Engage Hide nFOV Tsearch
50                         T/F    x.x      T/F        T/F   T/F  x.x    x.x
```

Table 13: Vehicle File Input Definitions

Table 13: Vehicle File Input Definitions		
Line	Variable	Definition
1	Vehicle Name	Seven character vehicle name must agree with use in other files.
3	*Turret Dimensions:*	
	Height	Height in meters of box which represents turret
	1/2 Width	1/2 width in meters of box which represents turret
	Front Length	Length in meters of front part of box which represents turret
	Back Length	Length in meters of back part of box which represents turret
5	*Hull Dimensions:*	
	Height	Height in meters of box which represents hull
	1/2 Width	1/2 width in meters of box which represents hull
	Front Length	Length in meters of front part of box which represents hull
	Back Length	Length in meters of back part of box which represents hull
Target Acquisition:		
7	Optical Contrast (HD)	Optical contrast for this vehicle when in a hull defilade position. Used when a visual sensor is looking at it. It is defined as the difference between the average luminance of the vehicle and the average luminance of the background divided by the average luminance of the background.

Table 13: Vehicle File Input Definitions		
Line	Variable	Definition
	Optical Contrast (FE)	Optical contrast for this vehicle when in a fully exposed position.
8	Thermal Contrast (HD)	Thermal contrast for this vehicle when in a hull defilade position. Used when a thermal sensor is looking at it. It is defined as the difference between the average temperature of the vehicle and the average temperature of the background in degrees Celsius.
	Thermal Contrast (FE)	Thermal contrast for this vehicle when in a fully exposed position.
9	Charac Dim	Characteristic Dimension. Used for both visual and thermal sensors. It is the square root of the product of the vehicle's height times the vehicle's width (in meters). Entered for hull defilade, and for fully exposed. These do not necessarily need to be the same as the vehicle's box dimensions as input on lines 3 and 5.
10	Radar Cross Section	Used when the opposing sensor is a radar acquisition device. This is most commonly referred to simply as the cross section or target size in meters squared. More precisely, it is the area intercepting that amount of power which, when scattered equally in all directions, produces an echo at the radar equal to that from the target.
12	Max speed	Maximum speed in meters/second that the vehicle may move. For attacking vehicles, this is the speed at which the units move closer to the defender locations. Even if the vehicle is to be stationary in the battle, the user must input a non-zero maximum possible speed. Note: This is really a *Radial Approach* velocity.
	Acceleration	Acceleration of the vehicle in m/s2
	Deceleration	Deceleration of the vehicle in m/s2
	Pause in Defilade	This variable controls the movement of attackers when engaging a target, and line-of-sight (LOS) is about to break. An input value of "1" causes the attacker to move to a hull defilade posture and halt, keeping LOS to the target in order to continue the engagement. An input value of "0" allows the attacker to continue advancing, thus discontinuing the engagement when LOS breaks.

Table 13: Vehicle File Input Definitions		
Line	Variable	Definition
14	*Time to Leave Battle:*	
		During the battle certain situations prompt a vehicle to attempt to leave the battlefield. The inputs on this line are the mean time (in seconds) to leave the battlefield and reach a full defilade posture. The model draws from a normal distribution about this mean when calculating the appropriate time.
	Jockey	Time (secs) to leave the battle for a defender or an overwatch vehicle, when it either moves to a new position for firing, or moves to a full-defilade position to reload a missile pod. During this movement time, the vehicle is vulnerable to enemy fire.
	When Empty	Time (secs) to leave battle when a unit (vehicle) is out of ammunition and tries to move to a full defilade position to avoid being killed.
	When F-killed	Time (secs) to leave battle after a unit (vehicle) is F-killed and can no longer fire.
APS:		
		An *active protection system (APS)* is a vehicle survivability enhancement, which may detect and change the effectiveness of an incoming projectile. The APS protects an area defined by an arc centered at the front of the vehicle and may be deployed a set number of times. The system works in four stages: detection, fire, intercept, and degrade.
16	Arc of Protection	The arc (degrees) in front of the vehicle the APS will cover.
	Num Launches	The number of times the vehicle can activate its APS.
If, and only if, the number of times the system may activate is greater than zero the user needs to enter the additional information which defines the APS:		
18	Num Ranges	Number of range entries for degradation factors (see below). The range entries must be in increments as specified in the game file.

Table 13: Vehicle File Input Definitions		
Line	Variable	Definition
		The first value must be equal to the range increment, and the last range value must be greater than or equal to the max firing range of the enemy weapon system.
19	Weapon	Seven-character weapon name, against which the APS will activate.
22	Pdet(HD)	Probability of detecting the incoming round (when in hull defilade)
	Pfh(HD)	Probability of firing at an incoming round that will hit (when in hull defilade)
	Pfm(HD)	Probability of firing at an incoming round that will miss (when in hull defilade)
	Pint(HD)	Probability of intercepting the incoming round (when in hull defilade)
24-32	Range	Range increment (m) for which the degradation factors apply
	Degradation Factors	The degradation factors for each 30 degree sector within the arc of protection. These factors are multiplied times the lethality of the incoming round (i.e., if P(kill)=.6 and deg. factor=.2, the resultant P(kill)=.12).
35	Pdet(FE)	Probability of detecting the incoming round (when fully exposed)
	Pfh(FE)	Probability of firing at an incoming round that will hit (when fully exposed)
	Pfm(FE)	Probability of firing at an incoming round that will miss (when fully exposed)
	Pint(FE)	Probability of intercepting the incoming round (when fully exposed)
37-45	Range	Range increment (m) for which the degradation factors apply

Table 13: Vehicle File Input Definitions		
Line	Variable	Definition
	Degradation Factors	The degradation factors for each 30 degree sector within the arc of protection. These factors are multiplied times the lethality of the incoming round (i.e., if P(kill)=.6 and deg. factor=.2, the resultant P(kill)=.12).
Additional sets of input consisting of (weapon name, probabilities, and degradation) are entered next for each weapon against which this system is effective. When all affected weapons have been entered, enter "END" as the next line.		
46	END	End of APS section.
Smoke Grenades:		
		Another survivability enhancement modeled is an on board *smoke grenade system*. The system has the ability to detect an incoming round and to deploy a smoke cloud around the target vehicle which affects target acquisition by and of this vehicle.
48	Num Grenades	Number of times the grenade launcher can fire. (This is not necessarily the total number of grenades.)
	P(Launch)	Probability that the system will detect and deploy.
	Alpha-CL(opt)	Level of smoke which affects optical sensors.
	Alpha-CL(ther)	Level of smoke which affects thermal sensors.
	Alpha-CL(radar)	Level of smoke which affects radar sensors.
	Time to Deploy	The time (sec) from launch of the grenade to the effective formation of the smoke cloud around the vehicle.
	Duration	The effective duration (sec) of the smoke cloud from the time it forms.

Table 13: Vehicle File Input Definitions		
Line	Variable	Definition
LWR:		
		The last survivability enhancement is a *laser warning receiver (LWR)* system which may be activated when the vehicle gets lased prior to being engaged. For the LWR to react, the engaging weapon system must be using a laser range finder (defined in the weapon input file). Three reactions by the lased vehicle are possible: 1) Pop smoke grenades, 2) Turn and engage the combatant who lased, and 3) Attempt to reach a full defilade posture. Any combination of these reactions can be played simultaneously.
50	If LWR	If there is an LWR on board, true or false (T/F).
	P(det)	Probability that the LWR will detect that it has been lased, and react.
	Pop-Smoke	T/F. If T, user must enter appropriate values on the smoke grenade line (48 above). If smoke grenades are to be triggered by LWR only, the probability of sensing, *P(Launch)*, on line 48 above must be set to 0.0.
	Engage	T/F. T if tactic is to turn to engage combatant who lased. (If T, see last two input variables on this line.)
	Hide	T/F. T if tactic is to attempt to reach a full defilade position.
	Num FOV	When the *Engage* tactic is played, the LWR can achieve different levels of accuracy when pointing in the direction of the threat. If the LWR can give a precise location of the enemy, the entry for this input is 1.0. The lased vehicle's observer then searches in NFOV and the only requirement is to check if .75 line pairs can be resolved across the target (detection criteria). Otherwise the user should enter the general area to search for the threat as a number of fields of view of the appropriate sensor. In this case, the lased vehicle's observer searches in WFOV for these number of fields of view for the enemy using detection criteria (.75 line pairs). Once acquired in WFOV, the observer must then attempt to acquire the enemy in NFOV, as usual.

Table 13: Vehicle File Input Definitions		
Line	Variable	Definition
	Tsearch	When the *Engage* tactic is played, the time (sec) to search for the enemy before resuming normal search.

2.4 Weapon File

There must be two weapon files present to run the model: a BLUE weapons file, *bweap*, and a RED weapons file, *rweap*. Each file contains subsections which describe one weapon system each. For each weapon subsection the user defines firing times, reliability, times to reload, type of round etc. The general structure of the *Weapon File* is shown in Table 14. Table 15 lists the Weapon File input variable definitions.

Table 14: Weapon File

Line	
0	** Comment Line(s)
1	Weapon Name
2	--Type FireMax Nrounds Halt-to-fire Tactic Nrpt LRF isLO Rinc iEMG
3	xx xxxx. xx x x xx T/F T/F xxx. T/F
4	--Inputs by Range: P(sense), T(flight), T(first), T(fixed), Reliab
5	x.xx x.xx x.xx x.xx ... x.xx x.xx ** P(sense)
6	xx.x xx.x xx.x xx.x ... xx.x xx.x ** T(flight)
7	xx.x xx.x xx.x xx.x ... xx.x xx.x ** T(first)
8	xx.x xx.x xx.x xx.x ... xx.x xx.x ** T(fixed)
9	x.xx x.xx x.xx x.xx ... x.xx x.xx ** Reliability
10	--Jockeying: If-Pop N(jockey) T(jockey)
11	x xx xx.x
12	--Subsequent Firing: T(median) T(min)
13	x.x x.x
14	--Burst Fire: Rate-of-Fire Nrnds/burst
15	x.x x
16	--Missiles: Disengage NinPod Ntgts T(reload) P(abt)/smk P(abt)/terr
17	x x x x.x x.xx x.xx
18	--Multiple Engagement: If-Mult T(mult) N(mult) Reload-part
19	x xx.x x x
20	--Lock-on Data: Max lock-on tries
21	x
22	--Battery Coolant Unit cooldown time
23	xx.x
24	--Prob(Lock-on) by Range: stat/HD, stat/FE, moving/FE
25	x.x x.x x.x ... x.x x.x ** stat/HD
26	x.x x.x x.x ... x.x x.x ** stat/FE
27	x.x x.x x.x ... x.x x.x ** moving/FE
28	--Mean(Lock-on) by Range: stat/HD, stat/FE, moving/FE
29	xx.x xx.x xx.x ...xx.x xx.x ** stat/HD
30	xx.x xx.x xx.x ...xx.x xx.x ** stat/FE
31	xx.x xx.x xx.x ...xx.x xx.x ** moving/FE
32	--Max(Lock-on) by Range: stat/HD, stat/FE, moving/FE
33	xx.x xx.x xx.x ...xx.x xx.x ** stat/HD
34	xx.x xx.x xx.x ...xx.x xx.x ** stat/FE
35	xx.x xx.x xx.x ...xx.x xx.x ** moving/FE
36	--Range-In
37	T/F
38	--EMG: Tgen MaxStore
39	xx.x x

Table 15: Weapon File Input Definitions

Table 15: Weapon File Input Definitions		
Line	Variable	Definition
1	Weapon Name	Seven character weapon name must agree with one of the weapon system names in the unit deployment file.
3	Type	Integer value from 1 to 4 defining the type of round: 1 = Kinetic Energy Round (KE) 2 = High Explosive Anti-Tank (HEAT) 3 = Fire and Forget Missile (FAF) 4 = Command Line-of-Sight Missile (CLOS)
	FireMax	Maximum effective firing range of the weapon
	Nrounds	Total number of rounds on board
	Halt-to-fire	Integer value defining whether system must halt to fire. 0 = System may fire weapon on the move 1 = System must halt to fire weapon
	Tactic	Integer value from 1 to 3 defining the disengagement tactic. 1 = Disengage after Catastrophic Kill 2 = Disengage after hitting the target 3 = Disengage after firing Nrpt rounds at the target (see next input)
	Nrpt	Number of rounds to fire at a target before disengaging (only used when playing tactic 3 above)
	LRF	T (true) if this weapon system uses a laser range finder prior to firing its first round of an engagement. The play of the range finder does not change the way accuracy is played. The only effect of setting this input to True is that it will now activate laser warning receivers on target vehicles. Input F for false if the weapon uses no LRF.
	isLO	T (true) if weapon is lock-on before launch system, else set to F (false).

Table 15: Weapon File Input Definitions		
Line	Variable	Definition
	RgInc	Range Increment for input for this weapon system. When range-dependent data are read in other input files, the ranges used must be in increments of this variable. Examples are vulnerability data, accuracy, and firing times. Increment is meters.
	iEMG	T (true) if this weapon is an Electromagnetic (EM) Gun, otherwise set it F (false). The Type (line 3) must be set to 1 (KE) if this iEMG input is true.
The next five lines contain data which are input by range. These data are input in range increments as specified in the game control file. Note: The first value on each line should be for the range equal to this increment (e.g., 500 meters), and not for range equal to 0 meters. There must be enough values on each line to cover up to and including the maximum firing range set on line three.		
5	P(sense)	Probability that the firer will sense the impact location of a round that misses its target.
6	T(flight)	The time (secs) of flight of the round to the various ranges.
7	T(first)	Median time (secs) to fire the first round of an engagement. Log-normal distribution draw.
8	T(fixed)	Fixed time (secs) between rounds when using an auto-loader. Always added when calculating time to fire.
9	Reliability	Probability that the round is reliable (i.e., not a dud).
11	*Jockeying:*	
		Groundwars allows systems which are either in defense or overwatch to increase survivability by moving, for a specified duration, to a full defilade posture at certain points in the battle. The input variables on this line concern jockeying.

Table 15: Weapon File Input Definitions		
Line	Variable	Definition
	If-Pop	Defines whether a missile system pops down (into full defilade) to reload. The missile system remains full defilade for the specified reload time, T(reload), mentioned later. Set to 1 if it should pop-down, 0 if not.
	N(jockey)	Number of shots fired before a KE weapon system will jockey. A value of 0 specifies that the system will not jockey.
	T(jockey)	The duration of time (sec) a KE system remains in full defilade during the jockey maneuver. The vehicle is invulnerable to enemy direct-fire during this time.
13	*Subsequent Firing Times:*	
		This line characterizes the subsequent firing times for the system. They are applied to all rounds fired at a target after the first for a specific engagement of firer/target. Before a subsequent round is fired, a random draw is made from a log-normal distribution about the median time to determine the random re-aiming time. This time is added to the fixed time between rounds if an auto-loader is being used. If this total time is less than the minimum time, then the minimum time to fire a subsequent round, T(min), will be used as the subsequent firing time.
	T(median)	Median time (sec) to fire a subsequent round.
	T(min)	Minimum time (sec) to fire a subsequent round.
15	Rate of Fire	Rounds per second within burst. Use 1.0 if not playing burst fire.
	Nrnds/burst	Number of rounds in a single burst. Use 1 if not playing burst fire.
17	*Missile System Attributes:*	
	Disengage	For missile systems which remain exposed during reload (if-pop equal 0), there are two choices for continuing an engagement. The system may be able to keep its fix on its target and therefore resume the engagement of that target upon finishing reloading. Some systems such as a hand-held one-soldier system cannot maintain a fix on the target and must begin the acquisition process anew after reloading. If the system cannot

Table 15: Weapon File Input Definitions

Line	Variable	Definition
		maintain a fix on the target while reloading and must disengage, then Disengage should be set to 1. If the system can maintain a fix while reloading, Disengage should be set to 0.
	NinPod	Number of missiles on board which are ready to fire. It is this number which will be reloaded when the ready rounds are depleted.
	Ntgts	The number of rounds which can be fired nearly simultaneously when playing Multiple Engagement. Ntgts should be set to 1 when not playing multiple engagement.
	T(reload)	The time (sec) required to reload the ready-to-fire missile pod.
	P(abt)/smk	Probability that the missile will abort due to an increase in the atmospheric attenuation (smoke).
	P(abt)/terr	Probability that the missile will abort when a break in line-of-sight occurs between firer and target during missile flight.
19	*Multiple Engagement Missiles:*	
		This line allows the play of a missile system which can queue targets and fire at them nearly simultaneously. A system may only multiply engage if its weapon type is a fire and forget missile.
	If-Mult	If multiple engagement is desired. 1 for yes, 0 for no.
	T(mult)	The time from initial detection to search for additional targets before beginning the engagement. After t(mult) has elapsed the firer will begin the engaging whatever number of targets have been acquired.
	N(mult)	The total number of targets to try to multiply engage. After n(mult) targets have been detected, the firer will fire a single shot at each target and disengage.
	Reload-part	When playing multiple engagement, a system is able to reload part of its missile pod so that it always has a full pod when engaging targets. Reload-part should be set to 1 if the system can reload part of the pod,

Table 15: Weapon File Input Definitions		
Line	Variable	Definition
		and if that is the desired tactic.
Lock-on Before Launch Systems:		
		Lines 21 through 35 describe input for a lock-on before launch system, (e.g., *Javelin*). This section should only be present if the lock-on parameter, *isLO*, on line 3 above is set to *True*. The methodology is as follows: After a target is acquired, a uniform random number [0,1] is drawn. If the random number is less than or equal to the probability of lock-on, a lock-on event is scheduled in *t* seconds. The time *t* is sampled from a log-normal distribution using the mean lock-on time, and is bounded by the maximum value *tmax(lock-on)*, and added with the BCU cooldown time. If the random number drawn was greater than the probability of lock-on, a *failed-lock-on attempt completion* is scheduled in *t* seconds (where t in this case is BCU cooldown time plus tmax(lock-on)). At lock-on attempt completion time, the following will occur. If the event was a *lock-on success* then a firing time is scheduled (based on time to fire first round and t-fixed). If the event was a *lock-on failure* then the number of lock-on tries is examined. If the number of lock-on tries to this point is less than max-lock-on-tries, then another lock-on attempt is scheduled immediately. If the number of lock-on tries to this point is equal to max-lock-on-tries, then the firer disengages the target and will enter search mode to look for new targets. If no new targets are found, the firer will return to this target to try another series of lock-on attempts in *n* seconds. This time *n* is input as *TLOOK* and is the same time used to reschedule a narrow-field-of view acquisition attempt after a wide-field-of-view success but narrow-field-of-view failure.
21	Max lock-on tries	Maximum number of times the gunner will try to achieve lock-on to target before giving up and looking for other targets.
23	BCU Ctime	Battery Coolant Unit cooldown time in seconds. This is the time it takes for a disposable assembly such as a BCU (battery coolant unit) on a *Javelin* to mate to the round to provide both power and cooling gases to the seeker.
The next three lines contain data which are input by range. These data are input in range increments as specified in the game control file. Note: The first value on each line should be for the range equal to this increment (e.g., 500 meters), and not for range equal to 0 meters. There must be enough values on each line to cover up to and including the maximum firing range set on line three.		
25	P(Lock-on)	Probability that the missile will lock-on to a target which is stationary

Table 15: Weapon File Input Definitions		
Line	Variable	Definition
	stat/HD	and hull defilade.
26	P(Lock-on) stat/FE	Probability that the missile will lock-on to a target which is stationary and fully exposed.
27	P(Lock-on) mov/FE	Probability that the missile will lock-on to a target which is moving and fully exposed.
The next three lines also contain data which are input by range, to be input similarly to the three lines above.		
29	Mean(Lock-on) stat/HD	Mean time (sec) for the missile to lock onto a target which is stationary and hull defilade.
30	Mean(Lock-on) stat/FE	Mean time (sec) for the missile to lock onto a target which is stationary and fully exposed.
31	Mean(Lock-on) mov/FE	Mean time (sec) for the missile to lock onto a target which is moving and fully exposed.
The next three lines also contain data which are input by range.		
33	Max(Lock-on) stat/HD	Maximum time (sec) for the missile to lock onto a target which is stationary and hull defilade.
34	Max(Lock-on) stat/FE	Maximum time (sec) for the missile to lock onto a target which is stationary and fully exposed.
35	Max(Lock-on) mov/FE	Maximum time (sec) for the missile to lock onto a target which is moving and fully exposed.
The next data line (37) should only be present if the system is a burst-fire weapon (i.e., the input variable Nrnds/burst on line 15 above was set to a value greater than one).		
37	Range-In	T or F for true or false. *Ranging-in* is a process used by gunners to adjust fire on the target. The range-in process lowers accuracy errors for weapon systems with limited fire control, since the gunner must correct

Table 15: Weapon File Input Definitions		
Line	Variable	Definition
		for errors associated with target range estimation, system biases, etc. The gunner achieves more accurate fire by adjusting the aimpoint in response to the perceived impact location of the preceding round. If this variable is set to T, then a Ranging-in file must be input (described later).
The next line describes input for an EM Gun. It should only be present if the EM Gun parameter, iEMG on line 3, is set to T (true).		
39	tgen	Time (in seconds) to generate enough energy in the compulsator to file one round.
	maxstore	Maximum number of shots possible to store (as energy) in the compulsator.

2.5 Sensor File

Groundwars allows the user to play optical, thermal, or millimeter wave devices, with a total of 6 sensors for both sides. As with the vehicle and weapon files, the sensor file is a group of subsections, one for each sensor. The BLUE sensor file is named *bsens* and the RED is *rsens*.

For optical and thermal devices, the model uses a form of the NVESD (Night Vision and Electronic Sensors Directorate) target acquisition methodology to determine acquisition capability. It also uses the AMSAA-developed Target Mis-Identification (Mis-ID) Methodology and ID-Call Methodology.[2] Groundwars models both wide and narrow field of view search, and input data is needed for both. For observers having both wide and narrow field of view on their sensor, Groundwars starts their search process with observers initially using their wide field of view (WFOV). After successful acquisition in WFOV, the observer will switch to narrow field of view (NFOV) and attempt to find the target based on the desired level of target discrimination for engaging in NFOV. If the target is not acquired in NFOV, the observer will switch back to WFOV to continue searching.

The level of target discrimination desired is specified by the user in the sensor input file for both WFOV and NFOV. The *Johnson Line Pair Criteria, N50*, are an empirically determined set of values used to define four levels of target discrimination. These values, N50, are the number of resolved cycles such that half the observers can discriminate a target at the respective level. The discrimination levels are defined as follows:

- Detection is the ability of an observer to distinguish that an object is of military interest.
- Classification is the ability to distinguish a target by general type; i.e. a tracked versus a wheeled vehicle.
- Recognition is the ability to distinguish between two targets of similar type; i.e. between two types of tracked vehicles, such as APCs and tanks.
- ID-Call (Identification-Call) represents the point at which the observer makes a decision to attempt ID (correct or incorrect).
- ID (Identification) is the ability to correctly discriminate the exact model of a target; i.e. a T72 or M1 tank.

The following values represent the recommendations for N50 values by the Target Acquisition Team, CSAD, AMSAA, as of June 1998:

- Detection - FLIR sensors: 1.0 (low clutter), 2.0 (medium clutter), 4.0 (high clutter); DVO & TV sensors: 4.0
- Classification – FLIR sensors: max (1.5, detection); DVO & TV sensors: 4.0
- Recognition - FLIR, DVO & TV sensors: 4.0
- ID-Call – FLIR, DVO & TV sensors: 5.0
- Correct ID - FLIR, DVO & TV sensors: 6.0

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[2] John P. Mazz and Frederick M. Campbell, "A Target MisIdentification (Mis-ID) Methodology," AMSAA technical Report TR-609, May 1997.

These values should be used in modeling sensor systems against a stationary target for the appropriate clutter condition (scenario driven) and level of acquisition required. These detection n50 values are associated with a false detection rate of 20 percent for FLIR and 10 percent for DVO/TV sensors.

An n50 value to represent the detection of moving targets should be equal to two-thirds that of the stationary detection values for the specific sensor type and clutter condition being modeled.

The performance of a millimeter wave sensor in the model is fixed except for changes in the atmosphere and differences in target RCS (radar cross section). The required data for optical and thermal devices is different from that for a radar device, so the structures of the subsection for the two types will be listed in separate tables. Table 16 lists the input structure for a VISUAL or THERMAL sensor. Table 18 lists the input structure for a RADAR sensor. Table 17 lists the input variable definitions for the VISUAL or THERMAL sensor file and Table 19 lists the definitions for the RADAR file.

Table 16: Sensor File - VISUAL/THERMAL

Line	
0	** Comment Line(s)
1	Sensor Name
2	-- Sensor Type: VISUAL or THERMAL
3	-- Data Type: TWENTY or NVLEXP
	(If data type is TWENTY, enter two 20-point curves for each FOV: one curve for Minimum Resolvable Contrast (MRC) or Temperature Difference (MRTD), and another curve for Spatial Frequency)
4	-- NFOV
5	x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx
6	x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx
7	x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx
8	x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx
9	-- WFOV
10	x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx
11	x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx
12	x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx
13	x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx x.xx
	(If data type is NVLEXP, enter 7 coefficients for each FOV)
4	-- NFOV
5	xx.xx xx.xx xx.xx xx.xx xx.xx xx.xx xx.xx xx.xx
6	-- WFOV
7	xx.xx xx.xx xx.xx xx.xx xx.xx xx.xx xx.xx xx.xx
	(lines 8 through 13 omitted for data type NVLEXP)
14	-- Horizontal FOS, Vertical FOS
15	xx.x xx.x
16	-- Horizontal NFOV, Vertical NFOV
17	xx.x xx.x
18	-- Horizontal WFOV, Vertical WFOV
19	xx.x xx.x
20	-- NFOV Magnification, WFOV Magnification
21	x.x x.x
22	-- NFOV Stat Acq Level, NFOV Mov Acq Level
23	x.x x.x

24	-- WFOV Stat Acq Level, WFOV Mov Acq Level
25	x.x x.x
26	-- N(dets), pfalse(HD), pfalse(FE)
27	x x.xx x.xx
28	-- Pinpoint probabilities
29	weapon1 x.xx
30	weapon2 x.xx
:	: :
n	weaponN x.xx
n+1	END

Table 17: VISUAL/THERMAL Sensor File Input Definitions

Table 17: VISUAL/THERMAL Sensor File Input Definitions		
Line	Variable	Definition
1	Sensor Name	Character String must agree with one of the sensor names in the unit deployment file.
2	Sensor Type	Character String: VISUAL or THERMAL
3	Data Type	Character String: TWENTY or NVLEXP. Data for visual or thermal sensors can be input in one of two ways. For TWENTY, the user enters two performance curves for NFOV and two for WFOV, which contain twenty points each (MRTD or MRC, and then spatial frequency). For NVLEXP the user enters seven coefficients to fit a sixth degree polynomial.
The following lines (4 through 13) are input when Data Type (above in line 3) is TWENTY.		
4	NFOV	Narrow Field of View (Header)
5	MRC or MRTD	MRC (if VISUAL sensor) or MRTD (if THERMAL sensor) curve values 1 through 10 for NFOV
6	MRC or MRTD	MRC (if VISUAL sensor) or MRTD (if THERMAL sensor) curve values 11 through 20 for NFOV
7	SpaFreq	Spatial Frequency curve values 1 through 10 for NFOV

Table 17: VISUAL/THERMAL Sensor File Input Definitions		
Line	Variable	Definition
8	SpaFreq	Spatial Frequency curve values 11 through 20 for NFOV
9	WFOV	Wide Field of View (Header)
10	MRC or MRTD	MRC (if VISUAL sensor) or MRTD (if THERMAL sensor) curve values 1 through 10 for WFOV
11	MRC or MRTD	MRC (if VISUAL sensor) or MRTD (if THERMAL sensor) curve values 11 through 20 for WFOV
12	SpaFreq	Spatial Frequency curve values 1 through 10 for WFOV
13	SpaFreq	Spatial Frequency curve values 11 through 20 for WFOV
The following lines (4 through 7) are input when Data Type (above, line 3) is NVLEXP.		
4	NFOV	Narrow Field of View (Header)
5	NVLEXP	Seven coefficients for calculating spatial frequency for NFOV
6	WFOV	Wide Field of View (Header)
7	NVLEXP	Seven coefficients for calculating spatial frequency for WFOV
(Lines 8 - 13 omitted for data Type NVLEXP)		
Lines 15 through 19 give the fields of view (FOV) and search (FOS). The FOV are characteristic of the sensor, and the FOS are based on battlefield responsibility.		
15	Hor FOS	Horizontal Field of Search (degrees)
	Ver FOS	Vertical Field of Search (degrees)

Table 17: VISUAL/THERMAL Sensor File Input Definitions		
Line	Variable	Definition
17	Hor NFOV	Horizontal Narrow Field of View (degrees)
	Ver NFOV	Vertical Narrow Field of View (degrees)
19	Hor WFOV	Horizontal Wide Field of View (degrees)
	Ver WFOV	Vertical Wide Field of View (degrees)
21	NFOV Mag	Narrow Field of View Magnification
	WFOV Mag	Wide Field of View Magnification
23	NS Acq	NFOV Stationary Acquisition Level (level of acquisition desired against stationary targets, in values of N50, the Johnson Line Pair Criteria).
	NM Acq	NFOV Moving Acquisition Level (level of acquisition desired against moving targets, in values of N50, the Johnson Line Pair Criteria).
25	WS Acq	WFOV Stationary Acquisition Level (level of acquisition desired against stationary targets, in values of N50, the Johnson Line Pair Criteria).
	WM Acq	WFOV Moving Acquisition Level (level of acquisition desired against moving targets, in values of N50, the Johnson Line Pair Criteria).
27	N(dets)	The number of targets which may be detected concurrently *(hunter-killer)* by a system with this sensor. If this sensor must remain fixed on the target while the gunner services the target, *n(dets)* should be set to 1. If other targets can be detected while the gunner is busy, *n(dets)* should be set to greater than 1.
	pfalse(HD)	Probability that a detected target in hull defilade is a false target. When a hull defilade target is first detected, a random draw is made against this probability to see if a false target will be randomly substituted for the real target.

Table 17: VISUAL/THERMAL Sensor File Input Definitions		
Line	Variable	Definition
	pfalse(FE)	Probability that a detected target that is fully exposed is a false target. When a fully exposed target is first detected, a random draw is made against this probability to see if a false target will be randomly substituted for the real target.
The last section defines the probabilities of this sensor detecting the firing signatures of other weapons in the battle. On each line enter another weapon name and the probability of detection given the weapon fires. Weapon names must match weapon names as input in the weapon file. When all desired weapon have been input, enter "END" to end the pinpoint section.		
29-n	Weapon	Character String of firing weapon
	P(pinp)	Probability of sensor detecting weapon by its flash.
n+1	END	End of Pinpoint section.

Table 18: Sensor File - RADAR

Line	
0	** Comment Line(s)
1	Sensor Name
2	-- RADAR
3	-- If-rain, Clutter
4	x x
5	-- N(dets), pfalse(HD), pfalse(FE)
6	x x.xx x.xx
7	-- Pinpoint probabilities
8	weapon1 x.xx
9	weapon2 x.xx
:	: :
n	weaponN x.xx
n+1	END

Table 19: RADAR Sensor File Input Definitions

Line	Variable	Definition
1	Sensor Name	Character String must agree with one of the sensor names in the unit deployment file.
2	Sensor Type	Character String: RADAR
Rain and clutter will affect radar acquisition.		
4	If-rain	Input 1 for rain, else 0 for no rain.
	Clutter	Level of Clutter. Use 1 for Low Clutter and 2 for High Clutter.
5 to END		*Same as lines 26 to END in VISUAL/THERMAL Sensor File.*

2.6 Accuracy File

For each weapon system defined in the two unit deployment files, there must be a file which contains weapon system delivery accuracies. BLUE accuracy files have the form *bacc?* where *?* is an integer representing the number of the blue weapon system. For example, if there are three different blue weapon systems, the blue accuracy files must be named, *bacc1*, *bacc2*, and *bacc3*. The same structure holds for all RED accuracy files, racc?. Each file has the structure shown in either Table 20 for non-burst-fire systems, or Table 21 for a burst-fire weapon.

The model requires shot biases and dispersions for three situations: stationary firer against a stationary target, a stationary firer against a moving target, and a moving firer against a stationary target. Groundwars does not model a moving firer against a moving target, and so does not require input data for this situation.

The file is free formatted, and all lines which begin with an "*" are comment lines included for clarity; comment lines may be added or removed between groups of data, but not within a group of data. All ranges are in meters, and all biases and errors are in *mils* (angular measurement equal to 1/6400 of a circle).

There exist three types of errors which are read into the model and can be classified according to how long they persist. *Fixed biases* are those which persist over many engagements. *Variable biases* are caused by transient effects such as cross wind, and vary from engagement to engagement. *Random errors* are those which change from round to round within an engagement and are caused by differences in individual rounds, wind gusts, etc.

The first two lines of each file must contain a weapon name and the number of range increments which will be input. The range input must account for all ranges from 0 up to and including the maximum firing range of the weapon.

The first section of the file is for a stationary firer against a stationary target. For this situation data is required for the first round fired and for subsequent rounds. For first rounds, fixed bias, variable bias and random error are required. For subsequent rounds only random error is needed. This error varies depending on whether the previous shot was a hit, a lost miss, or a sensed miss. Misses are either lost or sensed depending on the value of *p(sense)* in the weapon description file. For the number of ranges to be input, the user will enter a range and its corresponding errors for first and subsequent rounds.

The second section of the file is for a stationary firer against a moving target. This section has only two types of error: fixed bias and total error, which should include the variable bias, add-on, and subtractive dispersions for a moving target. These errors are required for four different attack angles: 0, 30, 60, and 90 degrees as is shown in the table.

The third section is for a moving firer against a stationary target. Only fixed bias and total error are required at each range.

The accuracy input for a burst-fire weapon is similar (see Table 21), but with a few differences. The variable bias is input for first burst and subsequent bursts separately. There is no input for random error based on the result of a previous round. And there is no breakdown by attack angle. Also, for a burst-fire weapon, if ranging-in is played (as specified in the weapon file), then a ranging-in file must be prepared for input (described later).

Table 20: Accuracy File: Non-burst

```
** Comment Line(s)
Weapon Name
x ranges
*                        STATIONARY FIRER vs STATIONARY TARGET
*                        ------------------------------------
*                    1st Round                  h/h        h/lm      h/sm
*          ------------------------------ --------- --------- ---------
*          fix bias var bias    ran err   ran err   ran err   ran err
*          --------- --------- --------- --------- --------- ---------
* rg (m)    H     V   H     V    H     V   H     V   H     V   H     V
* ------   ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ----
  rng1     .xxx .xxx .xxx .xxx .xxx .xxx .xxx .xxx .xxx .xxx .xxx .xxx
    :        :    :    :    :    :    :    :    :    :    :    :    :
  rngN     .xxx .xxx .xxx .xxx .xxx .xxx .xxx .xxx .xxx .xxx .xxx .xxx
*
*
*      STATIONARY FIRER vs MOVING TARGET
*      --------------------------------
*                    0 deg
*          fixed bias        total error
*          ----------        -------------
* rg (m)    H        V        H        V
* ------ ------- ------- ------- -------
   rng1    .xxx     .xxx     .xxx     .xxx
    :        :        :        :        :
   rngN    .xxx     .xxx     .xxx     .xxx
*
*                   30 deg
*          fixed bias        total error
*          ----------        -------------
* rg (m)    H        V        H        V
* ------ ------- ------- ------- -------
   rng1    .xxx     .xxx     .xxx     .xxx
    :        :        :        :        :
   rngN    .xxx     .xxx     .xxx     .xxx
*
*                   60 deg
*          fixed bias        total error
*          ----------        -------------
* rg (m)    H        V        H        V
* ------ ------- ------- ------- -------
    rng1   .xxx     .xxx     .xxx     .xxx
     :       :        :        :        :
    rngN   .xxx     .xxx     .xxx     .xxx
*
```

Table 20: Accuracy File: Non-burst

```
*
*                    90 deg
*            fixed bias          total error
*            ----------          -----------
* rg (m)      H         V         H         V
* ------ ------- ------- ------- -------
     rng1   .xxx     .xxx      .xxx      .xxx
      :       :       :         :         :
     rngN   .xxx     .xxx      .xxx      .xxx
*
*        MOVING FIRER vs STATIONARY TARGET
*        ---------------------------------
*            fixed bias          total error
*            ----------          -----------
* rg (m)      H           V     H         V
* ------    ----        ----    ----      ----
     rng1   .xxx        .xxx    .xxx      .xxx
      :       :         :         :         :
     rngN   .xxx        .xxx    .xxx      .xxx
```

Table 21: Accuracy File (Burst Fire)

```
** Comment Line(s)
Weapon Name
*                          STATIONARY-STATIONARY
*
x ranges                        Variable Bias
*            fix bias       1st bst    sub bsts        ran err
*            ---------     ---------  ---------     -----------
*  rg (m)     H    V        H    V     H    V         H    V
*  ------    ---- ----     ---- ----  ---- ----      ---- ----
    rng1     .xxx .xxx     .xxx .xxx  .xxx .xxx      .xxx .xxx
     :         :    :        :    :     :    :         :    :
    rngN     .xxx .xxx     .xxx .xxx  .xxx .xxx      .xxx .xxx
*
*                          STATIONARY-MOVING
*
*                               Variable Bias
*            fix bias       1st bst    sub bsts        ran err
*            ---------     ---------  ---------     -----------
*  rg (m)     H    V        H    V     H    V         H    V
*  ------    ---- ----     ---- ----  ---- ----      ---- ----
    rng1     .xxx .xxx     .xxx .xxx  .xxx .xxx      .xxx .xxx
     :         :    :        :    :     :    :         :    :
    rngN     .xxx .xxx     .xxx .xxx  .xxx .xxx      .xxx .xxx
*
*                          MOVING-STATIONARY
*
*                               Variable Bias
*            fix bias       1st bst    sub bsts        ran err
*            ---------     ---------  ---------     -----------
*  rg (m)     H    V        H    V     H    V         H    V
*  ------    ---- ----     ---- ----  ---- ----      ---- ----
    rng1     .xxx .xxx     .xxx .xxx  .xxx .xxx      .xxx .xxx
     :         :    :        :    :     :    :         :    :
    rngN     .xxx .xxx     .xxx .xxx  .xxx .xxx      .xxx .xxx
```

2.7 Vulnerability File

Traditional vulnerability calculations make use of a mapping procedure called *damage assessment lists (DALs)* or *standard damage assessment lists (SDALs)*. A DAL maps killed components and sets of components into *Degradation of Combat Utility (DCU)* or *Loss of Function (LoF)*, typically for *Mobility (M), Fire-Power (F), M or F,* and *Catastrophic Kill (K)*. The DCU estimates developed in the DAL process, defined as expected loss of function values, are typically used as if they reflected probabilities of no capability[3]. The DAL vulnerability data required for input to Groundwars will be referred to as "probability of kill" in the remainder of this report.

The vulnerability files contain probability of kill information which can be entered as either the *Probability of Kill given a Hit (PKH)* or as the *Probability of Kill given a Shot (PKS)*. Probabilities of kill are generated by the Survivability/Lethality Analysis Directorate's (SLAD) Ballistic Vulnerability/Lethality Division (BVLD) of the Army Research Laboratory (ARL), formerly the Ballistic Research Laboratory (BRL). The names of these files in the current working directory are similar to those for the accuracy files. BLUE files have the prefix *bpk*, and RED files begin with *rpk*. The BLUE files will be named: *bpk1, bpk2, ..., bpk10, bpk11, ...* PK files must exist for every combination of weapon system and target vehicle that may engage one another. The model checks to see if all combinations of weapons vs. vehicles have been entered (including BLUE vs. BLUE and RED vs. RED if these combinations are specified in the *engagement* file). For those that do not exist, the model will give a warning message. The user should check these warnings for the first runs of the study to be sure that no desired combination has been missed.

The model recognizes four levels of kill: *mobility kill, fire-power kill, mobility and fire-power kill,* and *catastrophic kill.* The four levels of kill have the following results in the model: A mobility kill renders an attacker unable to continue moving; the combatant remains at its current exposure and range, and can still engage. For a defender or overwatch unit, a mobility kill means that it may no longer pop down to reload or jockey to an alternate position. A fire-power kill leaves the combatant unable to fire, and it will attempt to reach cover to avoid being killed further. For a mobility and fire-power kill, the combatant can no longer function, but it is not totally destroyed. Vehicles which have sustained one of these levels of damage continue to draw fire, and may be killed at a higher level. A catastrophically killed combatant no longer functions, and all units know that it no longer is a threat.

The first section of every file contains the same information, whether the user uses PKH or PKS. On the first line the weapon name and the target vehicle name are given; these must agree with those input in the unit deployment files. On the second line two flags are set which dictate the form of the vulnerability data. *PK-Flag1* determines if the data is entered as PKH or PKS data. If this flag is set to a 0 or a 2 the data is PKS data. If the flag is set to 1, the data is PKH. The forms of these data will be described shortly.

The second flag on the line, *PK-Flag2*, determines if the data is independent of range to the target. For some weapons the lethality of the weapon is the same at all ranges. A "0" designates lethality which is a function of range and a "1" designates range independent vulnerability.

If the file contains PKS data, the next line following the PK flags contains a value describing the number of lines of input for each exposure condition. This value should correspond to the number of ranges

---

[3] Work began in 1988 by ARL and AMSAA to develop improved vulnerability metrics, called *Degraded States*, which overcomes most of the mathematical problems in the DAL process [J. Abell, L. Roach, M. Starks, "DEGRADED STATES VULNERABILITY ANALYSIS," BRL Technical Report BRL-TR-3010, June 1989]. An extension of Groundwars, called *DSWARS*, was written to use these new metrics and has been used for research purposes at AMSAA [G.R.Comstock, "The Degraded States Weapons Analysis Research Simulation (DSWARS): An Investigation of the Degraded States Vulnerability Methodology in a Combat Simulation," AMSAA Technical Report 495, February 1991].

for which PKS values are input.

The first two forms of data are probability of kill given a shot. The data for both forms are independent of target aspect angle and round dispersion. The two forms require the same data, but are entered in a different order. For both forms, the data should begin with range of 0 meters. If the first vulnerability flag is set to a 0, the data needs to be in the form shown in Table 22. When the flag is set to a 2, the data needs to be in the form shown in Table 23. When PKS data is being used, the probability of hit is forced to be 1.0 within the model, since the probability of hit was factored into the calculation of the PKS.

Table 22: PKS Vulnerability File (PK-Flag1 = 0)

```
* Comment Line(s)
Weapon-Name      Target-Vehicle-Name
 0    x     <-- PK-Flags
 x          <-- Num Ranges
** 0m    rng2   rng3   rng4   ...   rngN   | Kill Type  | Exposure
  x.xx   x.xx   x.xx   x.xx   ...   x.xx   | M-Kill     |   HD
  x.xx   x.xx   x.xx   x.xx   ...   x.xx   | F-Kill     |   HD
  x.xx   x.xx   x.xx   x.xx   ...   x.xx   | MorF-Kill  |   HD
  x.xx   x.xx   x.xx   x.xx   ...   x.xx   | K-Kill     |   HD
  x.xx   x.xx   x.xx   x.xx   ...   x.xx   | M-Kill     |   FE
  x.xx   x.xx   x.xx   x.xx   ...   x.xx   | F-Kill     |   FE
  x.xx   x.xx   x.xx   x.xx   ...   x.xx   | MorF-Kill  |   FE
  x.xx   x.xx   x.xx   x.xx   ...   x.xx   | K-Kill     |   FE
```

Table 23: PKS Vulnerability File (PK-Flag1 = 2)

```
** Comment Line(s)
Weapon-Name      Target-Vehicle-Name
2    x     <-- PK-Flags
x          <-- Num Ranges
**  M     F     MorF    K     |    Range    |  Exposure
  x.xx  x.xx  x.xx  x.xx  | 0 meters  |     HD
  x.xx  x.xx  x.xx  x.xx  | range 2   |     HD
  x.xx  x.xx  x.xx  x.xx  | range 3   |     HD
  x.xx  x.xx  x.xx  x.xx  | range 4   |     HD
    :     :     :     :   |    :      |      :
  x.xx  x.xx  x.xx  x.xx  | range N   |     HD
                          |           |
  x.xx  x.xx  x.xx  x.xx  | 0 meters  |     FE
  x.xx  x.xx  x.xx  x.xx  | range 2   |     FE
  x.xx  x.xx  x.xx  x.xx  | range 3   |     FE
  x.xx  x.xx  x.xx  x.xx  | range 4   |     FE
    :     :     :     :   |    :      |      :
  x.xx  x.xx  x.xx  x.xx  | range N   |     FE
```

The third data format is the *Individual Unit Action (IUA)* file as produced by the ARL. For this type of input data, PK-flag1 should be set to 1. The data is a function of target, aspect angle, target exposure, round dispersion and kill criteria. Table 24 below shows the general structure. This file, when available from ARL, should be received in this format. In certain cases, the IUA file from ARL may contain a fifth kill-type, *crew*. These are not used by Groundwars and should be deleted from the file.

For each range there is a group of 88 lines of PKH data. For vulnerability which is independent of range, there will be only one set of 88 lines. In each group of 88 lines there are 44 lines against a hull defilade target followed by 44 lines for fully exposed targets. In each group of 44 lines there are 11 sets of 4 lines. The first 10 sets of lines correspond to 10 linear dispersions (1-10 feet) and the 11th set is for a uniform distribution of shots on the target. Each of the four lines corresponds to one of the four kill categories.

Table 24: IUA (PKH) Vulnerability File (PK-Flag1 = 1)

```
** Comment Line(s)
Weapon-Name      Target-Vehicle-Name
1    x     <-- PK-Flags
--    range E  D K    0      30     60     90    120    150    180    Avg
       rng1 1  1 1  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
       rng1 1  1 2  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
       rng1 1  1 3  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
       rng1 1  1 4  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
       rng1 1  2 1  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
       rng1 1  2 2  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
       rng1 1  2 3  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
       rng1 1  2 4  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
       rng1 1  3 1  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
        :   :  : :    :      :      :      :      :      :      :
       rngN 2 10 3  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
       rngN 2 10 4  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
       rngN 2 11 1  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
       rngN 2 11 2  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
       rngN 2 11 3  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx
       rngN 2 11 4  x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx x.xxx

Definitions:
rng1 - 0 meters
rngN - last range for data
E - Target Exposure (1 for HD, 2 for FE)
D - Dispersion of round (1 to 10 feet, 11 is random dispersion)
K - Kill Type (1 is M-Kill, 2 is F-Kill, 3 is MorF-Kill, 4 is K-Kill)
Target Aspect Angle - Angle of the incoming projectile flight path
                      measured from the front of the target in the
                      horizontal plane (0 through 180 degrees).
```

2.8 Army File

The *army* file contains information that isn't specific to any one unit type. An army file is required for each army in the battle. The names of the two files are *barmy* and *rarmy*. The general structure of the file is shown in Table 25. The army file input variable definitions is listed in Table 26.

Table 25: Army File

Line	
0	** Comment Line(s)
1	--Tactics: Priority T(relook) N(bump) T(bump) Overw-eng
2	x xx.x x xx.x x
3	--Communications: If-comm P(pass) T(pass) T(search)
4	x x.xx xx.x xx.x
5	--Decoys: DecName N(flash) T(start) T(flash)
6	UNIT NAME x xx.x xx.x
7	--If Artillery
8	x
9	Target1
10	--Prep. Artillery M F M&F K
11	x.xx x.xx x.xx x.xx
12	--On-call Artillery M F M&F K
13	x.xx x.xx x.xx x.xx
14	Target2
15	--Prep. Artillery M F M&F K
16	x.xx x.xx x.xx x.xx
17	--On-call Artillery M F M&F K
18	x.xx x.xx x.xx x.xx
19	END

Table 26: Army File Input Definitions

Table 26: Army File Input Definitions		
Line	Variable	Definition
2	Priority	Target priority. If a unit is able to detect more than one target concurrently, the firer will pick older targets over new if this is set to 1, and newer targets over old if this is set to 2. If the unit cannot detect more than one target, this input will have no effect.
	T(relook)	The time a firer will search for other targets before going back to a previously serviced target and renewing the engagement (only if the target is still in line of sight and is not k-killed).
	The next two input variables are used when a target vehicle is mobility&firepower killed, and is no longer functioning. A firer will recognize a target in this condition as non-threatening, and will disengage it. The firer will disengage the target after firing N(bump) rounds at it or after waiting T(bump) seconds. When either of these conditions is met, the target is "bumped up" to an unthreatening vehicle, and all units will recognize that it is a non-target, and disengage if necessary.	
	N(bump)	The number of rounds fired during a given engagement by a firer against a target he has just MF-killed, before the target is bumped up to a non-threat, allowing disengagement by the firer and recognition by others in the force that it is a non-target. The nbump count starts with, and includes, the round which MF-killed the target.
	T(bump)	Duration of time (sec) before an MF-killed target is bumped up to a non-threat, allowing disengagement by its firer, and recognition as a non-target by others in the force.
	Overw-eng	Governs the play of overwatch vehicles for this army in the simulation. As described in the unit deployment file section, overwatch vehicles can either fire as soon as they acquire a target, or they may stay quiet until the enemy begins to fire. If the overwatch should fire upon acquiring a target, this input is a 1, else it is a 0.
The next line of input controls the play of communications between friendly vehicles.		
4	If-comm	When a unit detects an enemy unit, it may pass the enemy's location to other units on its side (e.g. *IVIS - Intervehicular Information System*). If the location is received, the receiver will conduct a field of view search in the area and attempt to acquire the target. Enter a 1 as the value for *If-comm* to

Table 26: Army File Input Definitions		
Line	Variable	Definition
		enable the play of this communication tactic, else enter 0.
	P(pass)	The probability that the others will receive the transmission of the target's location.
	T(pass)	The time (sec) to wait before the receiving vehicle will conduct its search. To have friendly units gang up on the detected target, set this wait time to 0.0. To have no others communicated to engage this target, set wait time to a large number.
	T(search)	Duration of time (sec) the receiving vehicle will search in the field of view before renewing normal search.
Decoys: The information necessary for the play of decoys is on the next line. Decoys are entered as any other unit and vehicle type in the unit deployment file. However, the weapon and sensor names should be set to "NULL" When the army file is read, the name of the decoy which is entered here is used to make all units of this type decoys. When only non-flashing decoys are played, the remaining inputs on this line should be set to 0. When flashing decoys are played the user must enter the probability of detecting the flashes in the opposing sensor file.		
6	DecName	Unit Name of decoy as entered in the Unit Deployment File.
	N(flash)	Number of flashing decoys (subset of total number of decoys).
	T(start)	Time in the battle (sec) when decoys should begin to flash.
	T(flash)	Average time (sec) between decoy flashes.
8	If Artillery	Set to 1 if artillery is to be played, else 0. Artillery can be preparatory or on-call. Prep artillery is called prior to the start of battle. On-call artillery is delivered during the battle at a random time. If a 0 is entered here, there will be no artillery and there are no more entries in the file. If the value entered is 1, the following lines must be input:

Table 26: Army File Input Definitions		
Line	Variable	Definition
9	Target1	Vehicle name of target
11	PrepPKs	Probability of Kill values for prep artillery vs target1 for Mobility-only, Fire-power only, M&F-kill-only, and K-kill.
13	OnCallPKs	Probability of Kill values for on-call artillery vs target1 for Mobility-only, Fire-power only, M&F-kill-only, and K-kill.
(Lines 9 through 13 repeated for as many targets as artillery affects. If artillery is played, for each enemy vehicle which is in the intended target area, there must be entered probabilities of kill. The names of all affected units must be entered.)		
19	END	Signifies no more artillery PKs to be entered.

2.9 Obscuration File

This file defines changes in the atmospheric conditions during the battle. These changes affect all combatants across the battlefield. Smoke in the model starts at a certain time, and has a finite duration. Both of these parameters are set by the user. Any number of smoke events can be played in the model, but the more smoke events played the slower the run time will be since all probabilities of acquisition and engagements are reassessed when the atmosphere changes. This file has the name *smkfile*. If no smoke is desired in the battle, then this file does not need to exist. Table 27 shows the format of the Obscuration File and Table 28 lists the input variable definitions.

Table 27: Obscuration File

Line	
0	`** Comment Line(s)`
1	`** start duration optic therm radar`
2	`xxxx. xxx. x.xx x.xx x.xx * 1st smoke event`
3	`xxxx. xxx. x.xx x.xx x.xx * 2nd smoke event`
:	`: : : : : :`
n	`xxxx. xxx. x.xx x.xx x.xx * nth smoke event`

Table 28: Obscuration File Input Definitions

Line	Variable	Definition
2	Start	Battle time (sec) when 1st smoke event starts.
	Duration	Duration (sec) of this smoke event
	Optic	Attenuation of transmission for optical sensors.
	Therm	Attenuation of transmission for thermal sensors.
	Radar	Attenuation of transmission for radar sensors.
3-n	*continues for each smoke event*	

2.10 Engagement Control File

Because Groundwars can model *fratricide*, or *'friendly fire'*, a file is needed to describe which units can engage one another. This file also eliminates the need for the simulation to calculate all of the engagement interactions that would take place between two units which would never realistically engage one another.

There is only one file, *engfile*, which describes the actions of both RED and BLUE units. If fratricide is not desired, this file can be ignored, and the model will revert to a battle with units engaging only enemy units; no friendly losses will occur. This file is somewhat complex and the user should take care in creating or modifying it.

Engagement is governed in the model by three parameters. The first parameter is a yes or no switch which determines if the engaging unit might engage units of each of the other types. Given that an observer, A_0, acquires a target, a check is then made to determine if A_0 attempts to identify the target through his sensor as either friendly or enemy. The input in the sensor files governs the ability of A_0 to make an ID-call on the target. If A_0 is using radar, it is assumed he cannot identify the target through his sensor. If A_0 perceives the target as friendly, he will break off the engagement. If A_0 perceives it as an enemy, he will engage the target. There is the possibility A_0 will incorrectly identify the target, and engage a friend, or disengage from an enemy. If A_0 is not able to make an ID-call, A_0 must make some decision whether he should engage this "gray" target. This decision is characterized in the model by the last two parameters, the *probability of engagement*, and a *time delay* associated with the decision.

The engagement file contains a subsection for each unit type in the battle. The general structure of a single subsection is shown in Table 29. The engagement file input variable definitions are listed in Table 30.

Table 29: Engagement Control File

Line	
0	`** Comment Line(s)`
1	`Engaging Unit's name`
2	`-- Target Names,  Is-It-A-Tgt,  P(engage),  T(engage)`
3	`  TgtName1  x  x.xx  xx.x`
4	`  TgtName2  x  x.xx  xx.x`
:	`  :  :  :  :`
n	`  TgtNameN  x  x.xx  xx.x`
n+1	`  'END'`

Table 30: Engagement File Input Definitions

Line	Variable	Definition
1	EngName1	The engaging unit's name
Following this line, there is a single line entry for all units which the engaging unit may consider as a target.		
3+	TgtName1	The engaged unit's name
	Is-It-A-Tgt	1 if TgtName1 is considered a potential tgt for EngName1, 0 if TgtName1 will not be engaged by EngName1
	P(engage)	Probability of EngName1 engaging TgtName1 when EngName1 is unable to identify TgtName1
	T(engage)	Time (sec) for EngName1 to decide to engage TgtName1 when unable to identify
Instead of listing all of the units in the battle, and entering a 0 for the ones not to be engaged, the user may enter only those wanted, and end the subsection by entering END as a unit name.		

A sample engagement file is shown in Table 31. The first subsection is for unit type BLUE1. BLUE1 will engage both BLUE2 and RED1. However, when he cannot identify a target which he has detected, he will engage BLUE2 only 40 percent of the time, but he will engage RED1 100 percent of the time. For example, this could be because RED1 may be further away or in an area where BLUE1 knows there are no friendly units, and BLUE2 may be in an area where there is a good chance that friendly vehicles may be located. BLUE2 has the location of BLUE1 and will only engage RED1. RED1 will engage both BLUE units, and he will always engage on detection since his probabilities of engaging are 1.0.

Table 31: Sample Engagement Control File

```
******** Engagement Table *********
'BLUE1'
-- Target Names,    Is-It-A-Tgt,    P(engage),   T(engage)
'BLUE2'             1               0.4          5.0
'RED1'              1               1.0          0.0
'END'
****
'BLUE2'
-- Target Names,    Is-It-A-Tgt,    P(engage),   T(engage)
'RED1'              1               1.0          5.0
'END'
****
'RED1'
-- Target Names,    Is-It-A-Tgt,    P(engage),   T(engage)
'BLUE1'             1               1.0          0.0
'BLUE2'             1               1.0          0.0
'END'
```

2.11 Combat Identification File 1 - Constant Emitter

Combat Identification Devices (CID) provide a means for an observer to identify a target as friend or foe in order to help prevent fratricide. Only if the engagement file exists can CID be played in Groundwars. Two ways of modeling a CID are possible in the model. The first type of combat identification device is one which constantly emits a signal *(CID1)*. These signals (emitted by *host* units) may be detected by friendly units, and sometimes enemy units. When a host unit with this type of CID is detected by a friendly observer, there is a probability associated with the CID that the observer will then know that the CID host is friendly. If this probability is met, the observer will disengage the target (host). The CID signal check is done by an observer/firer just prior to the gunner's planned firing. The CID signal being emitted can also aid others in detecting the host units. This aspect of the CID is modeled as a probability of detection in a given time period. If the time period were 30 seconds, for example, a random draw is done every 30 seconds to determine if any of the searching units will detect the host because of its signal.

The information to characterize these events is entered in the input file *cidfil1*. If this file is not included in the current working directory when Groundwars is run, then CID1 will not be played. The file contains a subsection for each different unit type in the battle which has a CID1 on board.

Table 32 shows a single subsection. Table 33 lists CID File 1 input variable definitions.

Table 32: Combat Identification File 1 - Structure

Line	
0	** Comment Line(s)
1	--CID Host Name, Time for Detection Check
2	'BLUE1' xx.
3	-- Probability of these observers CIDing host vehicle
4	'BLUE2' x.xx x.xx x.xx x.xx x.xx x.xx x.xx ...
5	'END'
6	-- Probability of these observers detecting host vehicle's CID signal
7	'BLUE2' x.xx x.xx x.xx x.xx x.xx x.xx x.xx ...
8	'RED1' x.xx x.xx x.xx x.xx x.xx x.xx x.xx ...
9	'END'

Table 33: Combat Identification File 1 Input Definitions

Line	Variable	Definition
2	CID Host Unit	Unit name of system carrying CID device
	Det Check Time	Time (sec) between CID detection attempts
4	ObsCID	Observer Unit Name (friendly systems of Host Unit)
	P(CID)	Probability (by range) of this friendly unit CIDing the host vehicle
:	:	
5	END	Ends this section
7	ObsDet	Observer Unit Name (friendly and enemy unit types able to detect Host Unit because of its CID signal)
	P(CDet)	Probability (by range) of this unit detecting the host vehicle's CID signal. These probabilities are based on the time specified on line 2 above.
:	:	
9	END	Ends this section

Table 34: Combat Identification File 1 - Sample

```
** Ranges: 500, 1000, 1500, ...
--CID Host Name,  Time for Detection Check
  'BLUE1'                  30.
  -- Probability of these observers CIDing host vehicle
      'BLUE2'  0.99 0.98 0.90 0.80 0.65 0.40 0.20 0.00
      'END'
  -- Probability of these observers detecting host vehicle's CID signal
      'BLUE2'  0.50 0.30 0.20 0.10 0.05 0.01 0.00 0.00
      'RED1'   0.30 0.15 0.07 0.03 0.01 0.005 0.00 0.00
  --CID Host Name,  Time for Detection Check
  'BLUE2'                  30.
  -- Probability of these observers CIDing host vehicle
      'BLUE1'  0.99 0.98 0.90 0.80 0.65 0.40 0.20 0.00
      'END'
  -- Probability of these observers detecting host vehicle's CID signal
      'BLUE1'  0.50 0.30 0.20 0.10 0.05 0.01 0.00 0.00
      'RED1'   0.30 0.15 0.07 0.03 0.01 0.005 0.00 0.00
      'END'
```

Table 34 shows an example of a CID1 file. From the sample engagement file, there are two BLUE unit types, BLUE1 and BLUE2, and 1 RED unit type, RED1. The first subsection in the sample CID1 file is for BLUE1 as a CID1 host. The first section shows that BLUE2 has a 0.99 probability of CIDing BLUE1 at 500 m. and that probability drops to 0.20 at 3500 m. The next section describes BLUE2 and RED1's probabilities of detecting BLUE1's CID1 signal every 30 seconds. So if RED1 were 2000 m. away from BLUE1, RED1 would have a 3 percent chance of detecting BLUE1 every 30 seconds. BLUE2 has a 10 percent chance of detecting BLUE1 (and thus identifying BLUE1 as friendly) every 30 seconds.

If an observer from BLUE2 detects BLUE1's CID1 signal, he automatically CIDs BLUE1 as friendly.

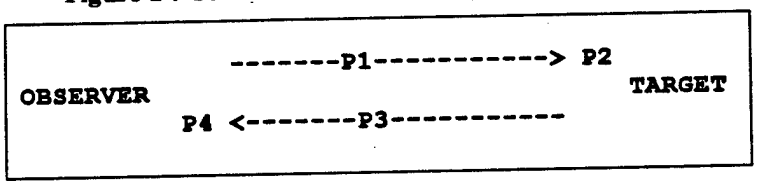
The second subsection in the table shows the probabilities when BLUE2 has a CID1 type system on board. Again the probabilities are given for correct CID and for detection of the CID signal. There is no subsection for RED1 because RED1 does not have a CID1 on board in this battle.

2.12 Combat Identification File 2 - Query-Response

The second type of combat identification device which can be played is a *query-response* type system. This type of CID is used after an observer detects a target and before the observer fires at it. Just prior to firing at the target, the firer queries the target, and tries to elicit a response from the target. If the target receives the signal and returns a response, the firer will discontinue the firing sequence, disengage the target, and begin looking for new targets.

Associated with this query and response are four probabilities and a time delay. The diagram below illustrates these inputs. P1 is the probability that when the host (observer) queries a target, the signal will reach the target. P3 is the probability that the target's response will get back to the host (observer's) vehicle. P2 and P4 are the probabilities that the target and then the host (observer's) vehicle will correctly interpret the query and response, respectively. The time delay is simply the time from the initial query, to the observer interpreting the response. What the diagram does not show is that when the target sends out its response, there may be some chance that the response will be detected by enemy units, which may then engage that target.

Figure 1 : Combat Identification Type 2 Methodology



The input file for this type of CID is named *cidfil2*. The file is divided into a subsection for each unit type in the battle. The structure of the subsection is shown in Table 35. Table 36 lists the CID2 file input variable definitions.

Table 35 : Combat Identification File 2 - Structure

Line	
1	---CID Host Unit
2	Host Name *** Number of CID Attempts
3	x *** CID Time Delay
4	x.xx x.xx x.xx x.xx ... *** P1
5	x.xx x.xx x.xx x.xx ...
6	--- Probability of CID2 Against These Targets
7	Target1 Name
8	x.xx x.xx x.xx x.xx x.xx ... *** P2
9	x.xx x.xx x.xx x.xx x.xx ... *** P3
10	x.xx x.xx x.xx x.xx x.xx ... *** P4
11	Target2 Name
12	x.xx x.xx x.xx x.xx x.xx ... *** P2
13	x.xx x.xx x.xx x.xx x.xx ... *** P3
14	x.xx x.xx x.xx x.xx x.xx ... *** P4
15	'END'
16	--- Probability of Detecting These Targets' Responses
17	Target1 x.xx x.xx x.xx x.xx x.xx ... *** P(detect)
18	'END'

Table 36: Combat Identification File 2 Input Definitions

Line	Variable	Definition
2	CID Host Unit	Unit name of querying system carrying CID device
3	Num CID Attempts	The number of times this unit will query a target before engaging it. If the firer receives a positive response from any query he will disengage the target, and not query again. If this unit has no CID then the input is 0.
4	CID Time Delay	The time from the initial query to the observer interpreting the response (by range).
5	P1	The probabilities that when the host queries a target, the signal will reach the target (by range).
Next there is a subsection for each unit type to be queried by the CID. Within each subsection the user enters the target unit's name, and P2, P3, and P4. The section must be ended with an 'END' as the target name.		
7	QTgt Name	Unit name of system type to be queried by the CID.
8	P2	Probabilities that the target will correctly interpret the query (by range).
9	P3	Probability that target's response will get back to host vehicle (by range).
10	P4	Probabilities that the host will correctly interpret the response (by range).
The last section defines the chance for the host vehicle to detect a target when it responds to a CID2 query.		
17	RTgt Name	Unit name of system type which responds to a CID2 query.
	P(Cdetect)	Probabilities that the host vehicle will detect RTarget when it responds to a CID2 query (by range).

Table 37 shows a sample CID2 file. BLUE1 has a CID2 type device on board and will query a target one time before engaging it. The time delay associated with its CID varies from 1.0 second at 500 m. to 1.2 seconds at 3500 m., and its probabilities of CID (P1 values) are very high. BLUE1 is only able to CID BLUE2 since there is no entry for RED1. BLUE1 is also able to detect BLUE2 when it responds to a query. If a firer from BLUE1 queries a unit from BLUE2, other observers from BLUE1 have a 0.1 probability of detecting that response at 2000 m.

Table 37: Combat Identification File 2 - Sample

```
*** Comment Line(s)
BLUE1
   1                                          *** Number of CID Attempts
   1.0 1.0 1.0 1.1 1.1 1.1 1.2                *** CID Time Delay
   1.0 1.0 1.0 1.0 1.0 1.0 0.85               *** P1
 --- Probability of CID2 Against These Targets
     BLUE2
        1.0 1.0 1.0 1.0 1.0 1.0 1.0           *** P2
        1.0 1.0 1.0 1.0 1.0 1.0 0.85          *** P3
        1.0 1.0 1.0 1.0 1.0 1.0 1.0           *** P4
     'END'
 --- Probability Detecting These Targets' Responses
     BLUE2 0.2 0.2 0.2 0.1 0.1 0.0 0.0        *** P(detect)
     'END'
*** Comment Line(s)
BLUE2
   2                                          *** Number of CID Attempts
   1.0 1.0 1.0 1.1 1.1 1.1 1.2                *** CID Time Delay
   0.5 0.5 0.3 0.3 0.2 0.1 0.0                *** P1
 --- Probability of CID2 Against These Targets
     BLUE1
        1.0 1.0 1.0 1.0 1.0 1.0 1.0           *** P2
        1.0 1.0 1.0 1.0 1.0 1.0 0.85          *** P3
        1.0 1.0 1.0 1.0 1.0 1.0 1.0           *** P4
     'END'
 --- Probability Detecting These Targets' Responses
     'END'
*** Comment Line(s)
RED1
   0                                          *** Number of CID Attempts
   7*0.0                                      *** CID Time Delay
   7*0.0                                      *** P1
 --- Probability of CID2 Against These Targets
     'END'
 --- Probability Detecting These Targets' Responses
     BLUE1 1.0 1.0 1.0 1.0 1.0 1.0 1.0        *** P(detect)
     BLUE2 0.2 0.2 0.2 0.1 0.1 0.0 0.0        *** P(detect)
     'END'
```

The same is true when BLUE2 is the host platform. Its time delay also ranges from 1.0 to 1.2 seconds, but it will try to query a target twice before engaging. Its probabilities of CID (P1 values) are a bit lower than BLUE1's.

RED does not have a CID on board, but is able to detect both BLUE1 and BLUE2's CID responses. These probabilities of detection are entered in the last section in the table. For example, when BLUE1 queries BLUE2, RED1 has a probability of detecting that response of 0.2 at 500 m.

2.13 Range-In File

Ranging-in is a process used by gunners to adjust fire on the target. The range-in process lowers accuracy errors for weapon systems with limited fire control, since the gunner must correct for errors associated with target range estimation, system biases, etc. The gunner achieves more accurate fire by adjusting the aimpoint in response to the perceived impact location of the preceding round. If the range-in variable is set to True (T) in the Weapon Description Input File, then this Ranging-In file must be input. Range-in files are named *brng?* or *rrng?* for Blue and Red systems respectively. The "*?*" indicates sequential numbers from 1 to the number of weapons using range-in. For example, if the Blue force has 4 weapon systems, 3 of which are playing range-in, the model will look for *brng1*, *brng2*, and *brng3*.

When a firer is ranging-in, the model does not use the accuracy file and vulnerability fire input for calculating whether the target is hit, and for assessing damage. Instead, it uses the Range-In file input to determine how many bursts need to be fired before ranging-in to the target. The model will schedule the firer to fire that many bursts, and use the probability of kill values in the Range-In file to assess the damage on the last range-in round. If the target is not killed, the firer will then continue to engage the target, with the normal accuracy file and vulnerability file input then used as normal.

Table 38 shows the structure for the Range-In file. The Range-In File input variable definitions are listed in Table 39.

Table 38: Range-In Input File

```
Line
1    'BLUE1'
2    * SubFir, Min Range, Max attempts
3    x.x        xxxx.x          xx
4    *                        STATIONARY-STATIONARY
5    * Rng    1     2     3     4     5     6     7     8     9     10
6    rng1    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
7    rng2    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
8    rng3    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
9    rng4    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
10   rng5    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
11   *                          STATIONARY-MOVING
12   * Rng    1     2     3     4     5     6     7     8     9     10
13   rng1    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
14   rng2    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
15   rng3    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
16   rng4    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
17   rng5    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
18   *                          MOVING-STATIONARY
19   * Rng    1     2     3     4     5     6     7     8     9     10
20   rng1    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
21   rng2    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
22   rng3    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
23   rng4    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
24   rng5    x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x   x.x
25   *
26   * PK's for final range-in round
27   *       HD                                  FE
28   *       Mkill   Fkill   MFkill  Kkill   Mkill   Fkill   MFkill  Kkill
29   'RED1'
30   0       x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx
31   rng2    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx
32   rng3    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx
33   rng4    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx
34   rng5    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx
35   rng6    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx
36   *
37   * PK's for final range-in round
38   *       HD                                  FE
39   *       Mkill   Fkill   MFkill  Kkill   Mkill   Fkill   MFkill  Kkill
40   'RED2'
41   0       x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx
42   rng2    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx
43   rng3    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx
44   rng4    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx
45   rng5    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx
46   rng6    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx    x.xx
47   *
```

Table 39: Range-In File Input Definitions

Table 39: Range-In File Input Definitions		
Line	Variable	Definition
1	Weapon Name	Weapon name of system. Must match weapon name used in the Unit Input File.
3	SubFir	Subsequent firing time (sec) for range-in attempts.
	Min Range	Minimum range (m) at which ranging-in is needed.
	Max attempts	Maximum number of range-in attempts in an engagement.
Next are input three sets of range-in probability tables, for the firer-target combinations of stationary-stationary, stationary-moving, and moving-stationary.		
6-10	Range	Stationary Firer - Stationary Target Conditions. Range (m) from firer to target. The first range should be the value of the range increment input in the Game File. The last range should be equal to or greater than the maximum firing range of the weapon.
	P(rgin)	Probability of ranging-in using one round, two rounds, three rounds, . . . , ten rounds. The probability of ranging-in for the maximum range-in rounds must be equal to 1.0 as for each range they are cumulative probability distributions. During the game, a random number is drawn and the table is accessed to determine the number of range-in rounds needed. The last range-in round will "hit" the target and the impact is assessed using the Range-In PKH tables (see description of lines 29-35). In reality, the last range-in round will impact within a close enough distance to the target to cause the gunner to decide to start firing for effect. Thus, the last round does not always hit the target, but it might.
13-17		Stationary Firer - Moving Target Conditions. (as for 6-10)
20-24		Moving Firer - Stationary Target Conditions. (as for 6-10)

Table 39: Range-In File Input Definitions		
Line	Variable	Definition
Next, for each target type is input a PKH table to be used for the last range-in round. The PKs are entered as a function of IUA kill type, target exposure, and range.		
29	Vehicle Name	Vehicle name of target.
30-35	Range	Range (m) from firer to target (for Range-In PKH files). The first range should be zero. Increments must be as set in the game file. The last range should be equal to or greater than the maximum firing range of the weapon.
	RI-PKH	Range-in PKH values for M-kill, F-kill, MorF-kill, and K-kill. The first group of four are versus a hull defilade target, the second four are versus a fully exposed target. These values will be converted to M-only, F-only, M&F, K-kill, and no-kill for Groundwars' use.

2.14 Priority File

Since any unit may fire up to three different weapon types, a method is required to specify the priority of weapon system selection that a unit will use to determine which weapon it will fire at a given target type. A *Priority File* must be input for each force. The filenames for BLUE and RED are *bprio* and *rprio* respectively. Each file contains a decision table or Priority List which specifies the priority for weapon system selection for each weapon/target combination for three different range bands. Note: When same-side firing capability is planned (i.e., an *engfile* is created listing fratricide possibility), then same-side weapon/target priorities must also be specified in the *Priority File*.

The general structure of the *Priority File* is shown in Table 40. Table 41 lists the Priority File input variable definitions. Table 42 shows an example Priority File.

Table 40: Priority File

Line							
0	** Comment Line(s)						
1	* Firer	Tgt	Range				
2	* Unit	Unit	Band	Min	Max		
3	* Type	Type	Num	Range	Range	Priority	Weapon
4	* -----	------	------	-----	-----	--------	------
5	FirNam	TgtNam	1	xxxx	xxxx	1	weapn
6						2	weapn
7						3	weapn
8	* -----	------	------	-----	-----	--------	------
9			2	xxxx	xxxx	1	weapn
10						2	weapn
11						3	weapn
12	* -----	------	------	-----	-----	--------	------
13			3	xxxx	xxxx	1	weapn
14						2	weapn
15						3	weapn
16	:	:	:	:	:	:	:

Table 41: Priority File Input Definitions

Line	Variable	Definition
5+	Firer Name	The firer's unit name
	Target Name	The target's unit name
	Range Band Num	Range band number (must be 1, 2, or 3)
	Min Range	Minimum range (meters) of firing for this firer/target range band
	Max Range	Maximum range (meters) of firing for this firer/target range band
	Priority	Priority number (1, 2, or 3) for this firer to fire the specified weapon at this target for this range band

	Weapon	Weapon name for this firer to use to fire at specified target at this range band at the given priority

Table 42: Example Priority File

```
******* bprio - Blue Weapon Selection Table ************
*************************************************************
*
* Firer   Tgt    Range
* Unit    Unit   Band      Min     Max
* Type    Type   Num       Range   Range   Priority   Weapon
* -----  ------  ------    -----   -----   --------   ------
  BTANK   T80     1          0     1400        1       BWEP1
                                               2       BWEP2
                                               3       NULL
* -----  ------  ------    -----   -----   --------   ------
                  2        1400    3000        1       BWEP2
                                               2       NULL
                                               3       NULL
* -----  ------  ------    -----   -----   --------   ------
                  3        3000    3500        1       BWEP2
                                               2       NULL
                                               3       NULL
* -------------------------------------------------------------
  BTANK   BMP     1          0     1300        1       BWEP1
                                               2       BWEP2
                                               3       NULL
* -----  ------  ------    -----   -----   --------   ------
                  2        1300    3100        1       BWEP2
                                               2       NULL
                                               3       NULL
* -----  ------  ------    -----   -----   --------   ------
                  3        3100    3500        1       BWEP2
                                               2       NULL
                                               3       NULL
```

3. Computer Hardware and Software Requirements

3.1 Groundwars Version 6.52 Beta Release For PC

Included in the standard distribution is the Groundwars executable file `GW652.EXE`, and sample input and output files. The Groundwars executable file has been compiled with the Microsoft FORTRAN Powerstation Version 1.0 development system. Sample input and output files are in subdirectory SAMPLE.

There are two files that need to be installed on the PC where Groundwars is going to be run: DOSXMSF.EXE and DOSXNT.386. DOSXMSF.EXE is the actual DOS extender that allows the 32-bit Groundwars program to run under MS-DOS. DOXSNT.386 is a DPMI (MS-DOS protected mode interface) device driver that allows Groundwars to run as a 32-bit DOS-extended program under Windows. Both of these files are supplied from Microsoft as part of the licensing agreement with Microsoft FORTRAN, and are included on the Groundwars disk.

DOSXMSF.EXE and DOSXNT.386 need to be installed either in the same directory as Groundwars or in a directory that is contained in the DOS PATH environment variable. In addition, an entry in the SYSTEM.INI file under the [386Enh] section must be made. For example, if the two files are copied to the C:\GWARS directory, then the following entry must be made in SYSTEM.INI:

```
device=C:\GWARS\dosxnt.386
```

Earlier versions of Microsoft FORTRAN had some limited support for end-of-file handling using the "CTRL+Z" character. This character, which is number 26 in the ASCII table, is placed at the end of files by some editors and other file-creation utilities. Microsoft FORTRAN no longer treats this character as a special character and gives an error message when attempting to read it into a variable. GWARS input files should not contain this character, which resembles a small right-pointing arrow when displayed by editors capable of displaying all characters in a file.

At least 16 MB of RAM memory are required to run Groundwars.

3.2 Groundwars Version 6.52 Beta Release For UNIX

If the UNIX executable version of Groundwars has been obtained, the executable will be named **gw652**. At least 16 MB of RAM memory are required.

4. Sample Input Files

Below is a sample set of unclassified Groundwars input files which correspond to the sample output in the sections following.

bacc1

```
'BKE1'
8 ranges
*                    1st Round                                  h/h          h/lm          h/sm
*           ------------------------------                  ---------    ---------     ---------
*           fix bias    var bias     ran err                 ran err      ran err       ran err
*           ---------  ---------  ---------                 ---------    ---------     ---------
*  rg (m)     H    V     H    V     H    V                     H    V       H    V        H    V
*  ------   ---- ---- ---- ---- ---- ----                    ---- ----    ---- ----     ---- ----
     500   .020 .040 .000 .000 .861 .861                    .783 .783    .798 .798     .798 .798
    1000   .025 .040 .000 .000 .752 .752                    .674 .674    .687 .687     .687 .687
    1500   .030 .045 .000 .000 .643 .643                    .565 .565    .576 .576     .576 .576
    2000   .060 .020 .000 .000 .734 .734                    .456 .456    .465 .465     .465 .465
    2500   .080 .050 .000 .000 .725 .725                    .347 .347    .344 .344     .344 .344
    3000   .020 .030 .000 .000 .716 .716                    .238 .238    .233 .233     .233 .233
    3500   .020 .030 .000 .000 .716 .716                    .238 .238    .233 .233     .233 .233
```

4000 .020 .030 .000 .000 .716 .716 .238 .238 .233 .233 .233 .233

** STATIONARY vs MOVING TARGET

0 deg

rg (m)	fixed bias H	fixed bias V	total error H	total error V
500	.200	.800	.560	.800
1000	.300	.700	1.30	.700
1500	.400	.600	1.60	.600
2000	.500	.500	1.30	.500
2500	.600	.400	2.40	.300
3000	.700	.300	2.50	.200
3500	.700	.300	2.50	.200
4000	.700	.300	2.50	.200

30 deg

500	.200	.800	.560	.800
1000	.300	.700	1.20	.700
1500	.400	.600	1.60	.600
2000	.500	.500	1.30	.500
2500	.600	.400	2.40	.300
3000	.700	.300	2.50	.200
3500	.700	.300	2.50	.200
4000	.700	.300	2.50	.200

60 deg

500	.200	.800	.560	.800
1000	.300	.700	1.20	.700
1500	.400	.600	1.20	.600
2000	.500	.500	1.30	.500
2500	.600	.400	2.40	.300
3000	.700	.300	2.50	.200
3500	.700	.300	2.50	.200
4000	.700	.300	2.50	.200

90 deg

500	.200	.800	.560	.800
1000	.300	.700	1.10	.700
1500	.400	.600	1.50	.600
2000	.500	.500	1.70	.500
2500	.600	.400	2.20	.300
3000	.700	.300	2.50	.200
3500	.700	.300	2.50	.200
4000	.700	.300	2.50	.200

MOVING vs STATIONARY TARGET

rg (m)	fixed bias H	fixed bias V	total error H	total error V
500	.000	.000	.974	.989
1000	.000	.000	.865	.878
1500	.000	.000	.756	.767
2000	.000	.000	.647	.656
2500	.000	.000	.538	.545
3000	.000	.000	.429	.434
3500	.000	.000	.429	.434
4000	.000	.000	.429	.434

barmy

```
**********************************
*  Blue Army file
Priority of targets     Time to go back     Nbump     Tbump
        2                  60.0               2     30.0  1
Communication:          if commo     pcomm   tcomm    tsearch
                          0          0.0      0.0      0.0
Decoys:    VEH Name    Nflash   T-flash    R-flash
             'NULL'      0       0.0        0.0
Artillery: if artillery
      0
```

bpk1

```
** b1vr1.iua
'BKE1' 'RTNK'
1   0
**     Generic (Unclassified) PK data
            0 1  1 1  0.645 0.774 0.784 0.700 0.742 0.917 0.942 0.730
            0 1  1 2  0.895 0.911 0.907 0.880 0.880 0.934 0.944 0.898
            0 1  1 3  0.895 0.911 0.907 0.880 0.880 0.935 0.944 0.898
            0 1  1 4  0.414 0.345 0.289 0.001 0.226 0.829 0.928 0.293
            0 1  2 1  0.614 0.677 0.720 0.625 0.672 0.777 0.774 0.664
            0 1  2 2  0.749 0.785 0.812 0.764 0.770 0.810 0.780 0.778
            0 1  2 3  0.749 0.788 0.817 0.764 0.774 0.814 0.781 0.780
            0 1  2 4  0.388 0.348 0.323 0.053 0.283 0.601 0.727 0.304
            0 1  3 1  0.559 0.624 0.685 0.600 0.642 0.713 0.682 0.621
            0 1  3 2  0.666 0.728 0.768 0.732 0.722 0.747 0.688 0.721
            0 1  3 3  0.666 0.738 0.781 0.733 0.734 0.759 0.690 0.729
            0 1  3 4  0.349 0.330 0.331 0.113 0.301 0.520 0.625 0.301
            0 1  4 1  0.529 0.587 0.654 0.580 0.615 0.671 0.639 0.591
            0 1  4 2  0.626 0.693 0.734 0.715 0.685 0.707 0.645 0.688
            0 1  4 3  0.626 0.711 0.757 0.721 0.707 0.727 0.647 0.701
            0 1  4 4  0.330 0.312 0.324 0.145 0.302 0.475 0.579 0.295
            0 1  5 1  0.513 0.563 0.629 0.562 0.592 0.643 0.617 0.570
            0 1  5 2  0.605 0.671 0.711 0.704 0.660 0.682 0.623 0.668
            0 1  5 3  0.605 0.694 0.742 0.715 0.691 0.708 0.625 0.686
            0 1  5 4  0.319 0.298 0.313 0.160 0.295 0.447 0.556 0.288
            0 1  6 1  0.504 0.547 0.609 0.547 0.574 0.624 0.604 0.555
            0 1  6 2  0.593 0.657 0.696 0.697 0.644 0.666 0.610 0.655
            0 1  6 3  0.593 0.684 0.734 0.714 0.682 0.696 0.612 0.677
            0 1  6 4  0.313 0.289 0.303 0.165 0.288 0.430 0.542 0.281
            0 1  7 1  0.498 0.537 0.593 0.535 0.560 0.611 0.596 0.544
            0 1  7 2  0.585 0.647 0.687 0.693 0.634 0.655 0.602 0.647
            0 1  7 3  0.585 0.678 0.729 0.714 0.678 0.688 0.605 0.672
            0 1  7 4  0.309 0.282 0.294 0.167 0.280 0.418 0.534 0.276
            0 1  8 1  0.494 0.529 0.581 0.525 0.549 0.602 0.591 0.535
            0 1  8 2  0.580 0.641 0.681 0.691 0.628 0.648 0.597 0.642
            0 1  8 3  0.581 0.673 0.727 0.715 0.676 0.682 0.599 0.669
            0 1  8 4  0.306 0.278 0.287 0.167 0.274 0.410 0.529 0.272
            0 1  9 1  0.492 0.524 0.572 0.517 0.541 0.596 0.587 0.529
            0 1  9 2  0.577 0.636 0.677 0.690 0.624 0.642 0.594 0.638
            0 1  9 3  0.577 0.670 0.725 0.717 0.674 0.678 0.596 0.667
            0 1  9 4  0.304 0.275 0.282 0.167 0.270 0.404 0.525 0.269
            0 1 10 1  0.490 0.520 0.565 0.510 0.534 0.591 0.585 0.524
            0 1 10 2  0.574 0.633 0.674 0.689 0.621 0.638 0.591 0.636
            0 1 10 3  0.575 0.667 0.724 0.718 0.674 0.675 0.593 0.666
            0 1 10 4  0.303 0.272 0.278 0.166 0.266 0.399 0.522 0.267
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0	1	11	1	0.481	0.502	0.526	0.471	0.498	0.569	0.574	0.498
0	1	11	2	0.564	0.618	0.664	0.690	0.611	0.621	0.580	0.626
0	1	11	3	0.564	0.657	0.724	0.730	0.675	0.662	0.582	0.662
0	1	11	4	0.298	0.261	0.255	0.158	0.245	0.379	0.511	0.253
0	2	1	1	0.841	0.910	0.900	0.790	0.835	0.948	0.907	0.863
0	2	1	2	0.847	0.906	0.939	0.862	0.855	0.837	0.547	0.885
0	2	1	3	0.912	0.948	0.945	0.879	0.907	0.966	0.915	0.923
0	2	1	4	0.065	0.434	0.595	0.087	0.024	0.134	0.144	0.273
0	2	2	1	0.740	0.787	0.791	0.735	0.765	0.838	0.855	0.766
0	2	2	2	0.771	0.794	0.816	0.789	0.788	0.737	0.661	0.790
0	2	2	3	0.820	0.845	0.852	0.820	0.836	0.866	0.863	0.835
0	2	2	4	0.183	0.313	0.389	0.173	0.142	0.243	0.326	0.257
0	2	3	1	0.634	0.700	0.728	0.691	0.708	0.747	0.734	0.689
0	2	3	2	0.652	0.679	0.707	0.703	0.708	0.635	0.586	0.684
0	2	3	3	0.700	0.762	0.788	0.767	0.771	0.778	0.741	0.754
0	2	3	4	0.195	0.250	0.303	0.188	0.194	0.240	0.321	0.233
0	2	4	1	0.574	0.642	0.688	0.663	0.671	0.684	0.663	0.642
0	2	4	2	0.584	0.598	0.633	0.640	0.645	0.561	0.532	0.613
0	2	4	3	0.632	0.705	0.749	0.737	0.731	0.718	0.670	0.704
0	2	4	4	0.188	0.212	0.258	0.182	0.202	0.221	0.301	0.212
0	2	5	1	0.541	0.601	0.658	0.645	0.644	0.640	0.624	0.611
0	2	5	2	0.548	0.544	0.582	0.597	0.596	0.510	0.502	0.567
0	2	5	3	0.596	0.664	0.721	0.720	0.703	0.676	0.631	0.673
0	2	5	4	0.183	0.189	0.230	0.172	0.197	0.204	0.288	0.196
0	2	6	1	0.522	0.573	0.636	0.633	0.623	0.610	0.602	0.590
0	2	6	2	0.527	0.508	0.546	0.568	0.560	0.477	0.484	0.536
0	2	6	3	0.575	0.636	0.701	0.710	0.683	0.647	0.608	0.652
0	2	6	4	0.179	0.174	0.210	0.163	0.189	0.191	0.280	0.184
0	2	7	1	0.511	0.554	0.619	0.624	0.607	0.589	0.588	0.575
0	2	7	2	0.514	0.484	0.520	0.548	0.534	0.454	0.474	0.516
0	2	7	3	0.562	0.616	0.685	0.703	0.668	0.626	0.595	0.638
0	2	7	4	0.176	0.165	0.197	0.156	0.182	0.182	0.274	0.176
0	2	8	1	0.503	0.540	0.606	0.617	0.594	0.575	0.579	0.565
0	2	8	2	0.506	0.467	0.502	0.535	0.515	0.438	0.466	0.501
0	2	8	3	0.553	0.602	0.674	0.699	0.657	0.612	0.585	0.628
0	2	8	4	0.174	0.158	0.187	0.150	0.176	0.176	0.271	0.170
0	2	9	1	0.498	0.530	0.597	0.611	0.585	0.564	0.572	0.557
0	2	9	2	0.500	0.455	0.489	0.525	0.501	0.427	0.461	0.491
0	2	9	3	0.547	0.592	0.666	0.696	0.648	0.601	0.579	0.621
0	2	9	4	0.173	0.153	0.180	0.146	0.171	0.172	0.268	0.166
0	2	10	1	0.494	0.523	0.589	0.607	0.577	0.556	0.568	0.551
0	2	10	2	0.496	0.447	0.480	0.518	0.491	0.419	0.458	0.483
0	2	10	3	0.543	0.584	0.659	0.694	0.642	0.594	0.575	0.615
0	2	10	4	0.172	0.150	0.175	0.143	0.168	0.169	0.267	0.163
0	2	11	1	0.478	0.489	0.551	0.584	0.540	0.519	0.548	0.522
0	2	11	2	0.478	0.407	0.435	0.489	0.443	0.381	0.442	0.449
0	2	11	3	0.525	0.549	0.628	0.687	0.611	0.557	0.555	0.591
0	2	11	4	0.168	0.135	0.151	0.127	0.149	0.153	0.259	0.148
500	1	1	1	0.640	0.773	0.783	0.700	0.742	0.917	0.942	0.728
500	1	1	2	0.894	0.908	0.907	0.880	0.880	0.934	0.944	0.897
500	1	1	3	0.894	0.908	0.907	0.880	0.880	0.935	0.944	0.898
500	1	1	4	0.394	0.340	0.282	0.001	0.226	0.829	0.928	0.286
500	1	2	1	0.604	0.676	0.718	0.625	0.672	0.777	0.774	0.660
500	1	2	2	0.747	0.783	0.812	0.764	0.770	0.810	0.780	0.777
500	1	2	3	0.747	0.786	0.816	0.764	0.774	0.814	0.781	0.779
500	1	2	4	0.349	0.345	0.320	0.053	0.283	0.601	0.727	0.292
500	1	3	1	0.548	0.622	0.683	0.600	0.642	0.713	0.682	0.617
500	1	3	2	0.664	0.725	0.767	0.732	0.722	0.747	0.688	0.720
500	1	3	3	0.664	0.736	0.780	0.733	0.734	0.759	0.690	0.727
500	1	3	4	0.310	0.328	0.328	0.113	0.301	0.520	0.625	0.289
500	1	4	1	0.519	0.585	0.651	0.580	0.615	0.671	0.639	0.587

500	1	4	2	0.624	0.690	0.733	0.715	0.685	0.707	0.645	0.687
500	1	4	3	0.624	0.708	0.755	0.721	0.707	0.726	0.647	0.699
500	1	4	4	0.291	0.310	0.322	0.145	0.302	0.475	0.579	0.283
500	1	5	1	0.503	0.561	0.625	0.562	0.592	0.642	0.617	0.566
500	1	5	2	0.603	0.668	0.710	0.704	0.660	0.682	0.623	0.666
500	1	5	3	0.603	0.691	0.740	0.715	0.691	0.707	0.625	0.684
500	1	5	4	0.281	0.297	0.311	0.160	0.295	0.447	0.556	0.276
500	1	6	1	0.494	0.545	0.605	0.547	0.574	0.624	0.604	0.551
500	1	6	2	0.591	0.654	0.695	0.697	0.644	0.666	0.610	0.654
500	1	6	3	0.591	0.681	0.732	0.714	0.682	0.695	0.612	0.675
500	1	6	4	0.275	0.288	0.301	0.165	0.288	0.430	0.542	0.270
500	1	7	1	0.488	0.534	0.589	0.535	0.560	0.611	0.596	0.539
500	1	7	2	0.584	0.644	0.685	0.693	0.634	0.655	0.602	0.646
500	1	7	3	0.584	0.674	0.727	0.714	0.677	0.687	0.604	0.670
500	1	7	4	0.271	0.281	0.293	0.167	0.280	0.418	0.534	0.265
500	1	8	1	0.484	0.527	0.577	0.525	0.549	0.602	0.591	0.531
500	1	8	2	0.579	0.638	0.679	0.691	0.628	0.648	0.597	0.640
500	1	8	3	0.579	0.670	0.724	0.715	0.675	0.682	0.599	0.667
500	1	8	4	0.269	0.277	0.286	0.167	0.274	0.410	0.529	0.261
500	1	9	1	0.482	0.521	0.568	0.516	0.540	0.595	0.587	0.525
500	1	9	2	0.575	0.634	0.675	0.690	0.624	0.642	0.594	0.637
500	1	9	3	0.576	0.667	0.723	0.717	0.674	0.678	0.596	0.665
500	1	9	4	0.267	0.273	0.281	0.167	0.270	0.404	0.525	0.258
500	1	10	1	0.480	0.517	0.561	0.510	0.533	0.591	0.585	0.520
500	1	10	2	0.573	0.630	0.672	0.689	0.621	0.638	0.591	0.634
500	1	10	3	0.573	0.664	0.722	0.718	0.673	0.675	0.593	0.664
500	1	10	4	0.266	0.271	0.276	0.166	0.266	0.399	0.522	0.256
500	1	11	1	0.472	0.499	0.522	0.471	0.498	0.568	0.574	0.494
500	1	11	2	0.562	0.615	0.662	0.690	0.611	0.621	0.580	0.625
500	1	11	3	0.562	0.653	0.721	0.730	0.674	0.662	0.582	0.660
500	1	11	4	0.261	0.260	0.254	0.158	0.245	0.379	0.511	0.243
500	2	1	1	0.836	0.906	0.899	0.790	0.834	0.947	0.898	0.860
500	2	1	2	0.846	0.904	0.938	0.862	0.854	0.836	0.526	0.884
500	2	1	3	0.908	0.944	0.944	0.879	0.906	0.965	0.907	0.921
500	2	1	4	0.061	0.429	0.591	0.087	0.024	0.134	0.144	0.270
500	2	2	1	0.731	0.784	0.788	0.735	0.764	0.837	0.851	0.762
500	2	2	2	0.769	0.792	0.814	0.787	0.787	0.734	0.650	0.789
500	2	2	3	0.816	0.843	0.850	0.819	0.836	0.864	0.859	0.833
500	2	2	4	0.162	0.307	0.384	0.171	0.142	0.242	0.325	0.248
500	2	3	1	0.626	0.697	0.724	0.690	0.707	0.745	0.731	0.685
500	2	3	2	0.650	0.678	0.704	0.701	0.707	0.633	0.579	0.682
500	2	3	3	0.697	0.760	0.786	0.766	0.771	0.777	0.739	0.752
500	2	3	4	0.172	0.246	0.300	0.186	0.193	0.239	0.320	0.225
500	2	4	1	0.566	0.639	0.684	0.662	0.670	0.683	0.660	0.638
500	2	4	2	0.582	0.597	0.631	0.638	0.644	0.559	0.527	0.611
500	2	4	3	0.629	0.702	0.746	0.736	0.730	0.717	0.667	0.702
500	2	4	4	0.166	0.210	0.256	0.180	0.202	0.220	0.300	0.204
500	2	5	1	0.534	0.598	0.655	0.644	0.643	0.639	0.622	0.607
500	2	5	2	0.546	0.542	0.580	0.596	0.595	0.509	0.497	0.565
500	2	5	3	0.593	0.661	0.718	0.718	0.702	0.674	0.629	0.670
500	2	5	4	0.161	0.187	0.228	0.170	0.196	0.203	0.287	0.188
500	2	6	1	0.515	0.570	0.632	0.631	0.622	0.609	0.600	0.586
500	2	6	2	0.525	0.507	0.544	0.566	0.559	0.475	0.480	0.535
500	2	6	3	0.572	0.633	0.697	0.708	0.682	0.645	0.607	0.650
500	2	6	4	0.157	0.172	0.208	0.161	0.188	0.191	0.279	0.177
500	2	7	1	0.504	0.551	0.615	0.622	0.605	0.588	0.586	0.572
500	2	7	2	0.513	0.483	0.519	0.547	0.533	0.453	0.469	0.514
500	2	7	3	0.559	0.613	0.682	0.702	0.667	0.625	0.593	0.635
500	2	7	4	0.155	0.163	0.195	0.154	0.181	0.182	0.274	0.169
500	2	8	1	0.496	0.537	0.603	0.615	0.593	0.573	0.577	0.561
500	2	8	2	0.504	0.466	0.501	0.533	0.515	0.437	0.462	0.500

500	2	8	3	0.551	0.600	0.671	0.698	0.656	0.611	0.584	0.626
500	2	8	4	0.153	0.156	0.186	0.149	0.175	0.176	0.271	0.164
500	2	9	1	0.491	0.528	0.593	0.610	0.583	0.563	0.571	0.553
500	2	9	2	0.499	0.454	0.488	0.523	0.501	0.426	0.457	0.490
500	2	9	3	0.545	0.589	0.662	0.695	0.647	0.600	0.577	0.618
500	2	9	4	0.152	0.152	0.179	0.145	0.171	0.171	0.268	0.160
500	2	10	1	0.487	0.520	0.585	0.605	0.576	0.555	0.566	0.547
500	2	10	2	0.494	0.446	0.478	0.516	0.490	0.418	0.454	0.482
500	2	10	3	0.541	0.582	0.656	0.693	0.641	0.592	0.573	0.613
500	2	10	4	0.152	0.148	0.174	0.142	0.167	0.168	0.266	0.156
500	2	11	1	0.471	0.487	0.547	0.582	0.539	0.518	0.547	0.519
500	2	11	2	0.476	0.406	0.434	0.487	0.443	0.380	0.438	0.448
500	2	11	3	0.522	0.547	0.624	0.685	0.610	0.556	0.553	0.588
500	2	11	4	0.148	0.133	0.150	0.126	0.149	0.153	0.259	0.142
1000	1	1	1	0.631	0.771	0.783	0.700	0.742	0.917	0.942	0.725
1000	1	1	2	0.891	0.908	0.907	0.880	0.880	0.934	0.944	0.897
1000	1	1	3	0.891	0.908	0.907	0.880	0.880	0.935	0.944	0.897
1000	1	1	4	0.356	0.332	0.282	0.001	0.226	0.829	0.928	0.274
1000	1	2	1	0.590	0.674	0.718	0.624	0.672	0.777	0.774	0.656
1000	1	2	2	0.743	0.783	0.812	0.762	0.770	0.810	0.780	0.775
1000	1	2	3	0.743	0.785	0.816	0.763	0.774	0.814	0.781	0.777
1000	1	2	4	0.295	0.339	0.320	0.053	0.283	0.601	0.727	0.276
1000	1	3	1	0.535	0.619	0.682	0.597	0.642	0.713	0.682	0.612
1000	1	3	2	0.660	0.723	0.767	0.727	0.722	0.747	0.688	0.718
1000	1	3	3	0.661	0.733	0.780	0.729	0.734	0.758	0.690	0.725
1000	1	3	4	0.256	0.324	0.328	0.113	0.301	0.520	0.625	0.274
1000	1	4	1	0.506	0.581	0.651	0.577	0.615	0.671	0.639	0.582
1000	1	4	2	0.621	0.687	0.733	0.709	0.685	0.707	0.645	0.684
1000	1	4	3	0.621	0.704	0.755	0.714	0.707	0.726	0.647	0.697
1000	1	4	4	0.238	0.307	0.322	0.145	0.302	0.475	0.579	0.268
1000	1	5	1	0.490	0.556	0.625	0.559	0.592	0.642	0.617	0.561
1000	1	5	2	0.600	0.664	0.710	0.697	0.660	0.682	0.623	0.664
1000	1	5	3	0.600	0.687	0.740	0.708	0.690	0.707	0.625	0.681
1000	1	5	4	0.229	0.294	0.311	0.160	0.295	0.447	0.556	0.262
1000	1	6	1	0.481	0.540	0.604	0.544	0.573	0.623	0.604	0.546
1000	1	6	2	0.588	0.650	0.695	0.690	0.644	0.666	0.610	0.651
1000	1	6	3	0.588	0.677	0.731	0.706	0.682	0.695	0.612	0.672
1000	1	6	4	0.224	0.285	0.301	0.165	0.288	0.430	0.542	0.256
1000	1	7	1	0.476	0.530	0.589	0.531	0.559	0.610	0.596	0.534
1000	1	7	2	0.581	0.641	0.685	0.686	0.634	0.655	0.602	0.643
1000	1	7	3	0.581	0.670	0.727	0.707	0.677	0.687	0.604	0.667
1000	1	7	4	0.221	0.278	0.293	0.167	0.280	0.418	0.534	0.251
1000	1	8	1	0.472	0.522	0.577	0.521	0.548	0.601	0.591	0.526
1000	1	8	2	0.576	0.634	0.679	0.684	0.628	0.648	0.597	0.638
1000	1	8	3	0.576	0.665	0.724	0.708	0.674	0.681	0.599	0.664
1000	1	8	4	0.218	0.274	0.286	0.167	0.274	0.410	0.529	0.247
1000	1	9	1	0.469	0.517	0.567	0.513	0.539	0.595	0.587	0.519
1000	1	9	2	0.572	0.629	0.675	0.683	0.624	0.642	0.594	0.634
1000	1	9	3	0.572	0.662	0.722	0.709	0.673	0.677	0.596	0.662
1000	1	9	4	0.217	0.271	0.281	0.167	0.270	0.404	0.525	0.244
1000	1	10	1	0.467	0.513	0.560	0.506	0.533	0.590	0.585	0.515
1000	1	10	2	0.570	0.626	0.672	0.682	0.621	0.638	0.591	0.632
1000	1	10	3	0.570	0.659	0.721	0.711	0.672	0.674	0.593	0.661
1000	1	10	4	0.216	0.268	0.276	0.166	0.266	0.399	0.522	0.242
1000	1	11	1	0.459	0.495	0.521	0.467	0.497	0.568	0.573	0.489
1000	1	11	2	0.559	0.611	0.662	0.684	0.611	0.621	0.580	0.622
1000	1	11	3	0.559	0.648	0.720	0.723	0.673	0.661	0.582	0.657
1000	1	11	4	0.211	0.257	0.254	0.158	0.245	0.379	0.511	0.229
1000	2	1	1	0.830	0.899	0.899	0.790	0.833	0.945	0.890	0.857
1000	2	1	2	0.845	0.901	0.938	0.862	0.854	0.831	0.509	0.883
1000	2	1	3	0.904	0.940	0.944	0.879	0.906	0.964	0.899	0.919

1000	2	1	4	0.057	0.410	0.591	0.087	0.024	0.134	0.144	0.265
1000	2	2	1	0.721	0.779	0.788	0.734	0.763	0.835	0.846	0.758
1000	2	2	2	0.766	0.790	0.814	0.786	0.787	0.730	0.638	0.787
1000	2	2	3	0.811	0.840	0.849	0.818	0.836	0.863	0.855	0.831
1000	2	2	4	0.137	0.297	0.384	0.171	0.142	0.240	0.325	0.239
1000	2	3	1	0.617	0.693	0.724	0.689	0.706	0.743	0.728	0.681
1000	2	3	2	0.647	0.676	0.704	0.699	0.707	0.630	0.570	0.681
1000	2	3	3	0.693	0.757	0.785	0.764	0.771	0.775	0.736	0.749
1000	2	3	4	0.144	0.239	0.299	0.185	0.193	0.237	0.320	0.215
1000	2	4	1	0.557	0.635	0.683	0.660	0.670	0.681	0.658	0.634
1000	2	4	2	0.580	0.595	0.631	0.636	0.644	0.557	0.519	0.610
1000	2	4	3	0.626	0.699	0.745	0.733	0.730	0.715	0.665	0.699
1000	2	4	4	0.138	0.204	0.255	0.179	0.202	0.218	0.300	0.195
1000	2	5	1	0.525	0.594	0.654	0.641	0.642	0.637	0.620	0.603
1000	2	5	2	0.544	0.540	0.580	0.593	0.595	0.506	0.490	0.564
1000	2	5	3	0.590	0.658	0.717	0.715	0.702	0.673	0.627	0.668
1000	2	5	4	0.134	0.183	0.227	0.169	0.196	0.201	0.287	0.180
1000	2	6	1	0.507	0.566	0.631	0.629	0.621	0.607	0.598	0.582
1000	2	6	2	0.523	0.505	0.544	0.564	0.559	0.473	0.473	0.533
1000	2	6	3	0.569	0.630	0.696	0.705	0.681	0.644	0.605	0.647
1000	2	6	4	0.131	0.169	0.208	0.161	0.188	0.188	0.279	0.169
1000	2	7	1	0.496	0.547	0.614	0.620	0.604	0.586	0.584	0.568
1000	2	7	2	0.511	0.481	0.519	0.544	0.533	0.451	0.463	0.513
1000	2	7	3	0.556	0.610	0.681	0.698	0.666	0.623	0.591	0.633
1000	2	7	4	0.129	0.159	0.195	0.154	0.181	0.180	0.274	0.161
1000	2	8	1	0.488	0.534	0.601	0.613	0.592	0.571	0.575	0.557
1000	2	8	2	0.502	0.464	0.501	0.530	0.514	0.435	0.456	0.498
1000	2	8	3	0.548	0.596	0.669	0.694	0.655	0.609	0.582	0.623
1000	2	8	4	0.128	0.153	0.185	0.148	0.175	0.174	0.270	0.156
1000	2	9	1	0.483	0.524	0.591	0.607	0.582	0.561	0.569	0.549
1000	2	9	2	0.496	0.452	0.488	0.521	0.501	0.424	0.451	0.488
1000	2	9	3	0.542	0.586	0.661	0.691	0.646	0.598	0.576	0.616
1000	2	9	4	0.127	0.149	0.178	0.144	0.171	0.169	0.268	0.152
1000	2	10	1	0.479	0.517	0.584	0.603	0.575	0.553	0.564	0.543
1000	2	10	2	0.492	0.444	0.478	0.514	0.490	0.416	0.447	0.481
1000	2	10	3	0.538	0.579	0.654	0.689	0.640	0.591	0.571	0.610
1000	2	10	4	0.126	0.145	0.173	0.141	0.167	0.166	0.266	0.149
1000	2	11	1	0.463	0.483	0.545	0.579	0.537	0.516	0.545	0.515
1000	2	11	2	0.474	0.405	0.434	0.485	0.443	0.379	0.432	0.447
1000	2	11	3	0.520	0.544	0.623	0.681	0.608	0.554	0.552	0.586
1000	2	11	4	0.123	0.131	0.149	0.126	0.149	0.151	0.258	0.134
1500	1	1	1	0.621	0.763	0.779	0.700	0.742	0.917	0.942	0.719
1500	1	1	2	0.884	0.906	0.907	0.880	0.880	0.934	0.944	0.894
1500	1	1	3	0.884	0.906	0.907	0.880	0.880	0.935	0.944	0.894
1500	1	1	4	0.334	0.313	0.266	0.001	0.226	0.829	0.928	0.260
1500	1	2	1	0.577	0.663	0.716	0.624	0.672	0.776	0.774	0.650
1500	1	2	2	0.734	0.778	0.812	0.762	0.770	0.810	0.780	0.772
1500	1	2	3	0.734	0.781	0.816	0.763	0.774	0.814	0.781	0.774
1500	1	2	4	0.259	0.325	0.313	0.053	0.283	0.601	0.727	0.261
1500	1	3	1	0.522	0.609	0.680	0.597	0.642	0.713	0.682	0.606
1500	1	3	2	0.653	0.719	0.767	0.727	0.722	0.747	0.688	0.715
1500	1	3	3	0.653	0.729	0.779	0.729	0.734	0.758	0.690	0.722
1500	1	3	4	0.218	0.314	0.324	0.113	0.301	0.520	0.625	0.260
1500	1	4	1	0.493	0.571	0.648	0.577	0.614	0.670	0.639	0.576
1500	1	4	2	0.613	0.683	0.733	0.709	0.685	0.707	0.645	0.682
1500	1	4	3	0.614	0.701	0.755	0.714	0.706	0.726	0.647	0.694
1500	1	4	4	0.200	0.298	0.318	0.145	0.302	0.475	0.579	0.255
1500	1	5	1	0.478	0.547	0.622	0.558	0.591	0.642	0.617	0.555
1500	1	5	2	0.593	0.661	0.710	0.697	0.659	0.682	0.623	0.661
1500	1	5	3	0.593	0.684	0.740	0.708	0.689	0.707	0.625	0.678
1500	1	5	4	0.191	0.286	0.308	0.160	0.295	0.447	0.556	0.249

1500	1	6	1	0.469	0.531	0.602	0.543	0.573	0.623	0.604	0.540
1500	1	6	2	0.581	0.647	0.695	0.690	0.643	0.666	0.610	0.648
1500	1	6	3	0.581	0.673	0.731	0.706	0.680	0.694	0.612	0.669
1500	1	6	4	0.186	0.277	0.298	0.165	0.288	0.430	0.542	0.243
1500	1	7	1	0.463	0.521	0.586	0.531	0.559	0.610	0.596	0.528
1500	1	7	2	0.574	0.637	0.685	0.686	0.633	0.655	0.602	0.640
1500	1	7	3	0.574	0.666	0.726	0.706	0.675	0.686	0.604	0.664
1500	1	7	4	0.183	0.271	0.290	0.167	0.280	0.418	0.534	0.239
1500	1	8	1	0.460	0.513	0.574	0.521	0.547	0.601	0.591	0.520
1500	1	8	2	0.569	0.631	0.679	0.684	0.626	0.648	0.597	0.635
1500	1	8	3	0.569	0.662	0.723	0.708	0.672	0.681	0.599	0.661
1500	1	8	4	0.181	0.267	0.284	0.167	0.274	0.410	0.529	0.235
1500	1	9	1	0.457	0.508	0.564	0.512	0.539	0.594	0.587	0.514
1500	1	9	2	0.566	0.626	0.675	0.683	0.622	0.642	0.594	0.631
1500	1	9	3	0.566	0.658	0.722	0.709	0.671	0.677	0.596	0.659
1500	1	9	4	0.180	0.264	0.278	0.167	0.270	0.404	0.525	0.232
1500	1	10	1	0.455	0.504	0.557	0.505	0.532	0.590	0.585	0.509
1500	1	10	2	0.563	0.623	0.672	0.682	0.619	0.638	0.591	0.629
1500	1	10	3	0.563	0.656	0.721	0.711	0.670	0.674	0.593	0.658
1500	1	10	4	0.179	0.262	0.274	0.166	0.266	0.399	0.522	0.230
1500	1	11	1	0.447	0.486	0.518	0.467	0.496	0.567	0.573	0.483
1500	1	11	2	0.553	0.608	0.662	0.684	0.609	0.621	0.580	0.620
1500	1	11	3	0.553	0.645	0.719	0.722	0.670	0.661	0.582	0.654
1500	1	11	4	0.174	0.251	0.252	0.158	0.245	0.379	0.511	0.217
1500	2	1	1	0.819	0.883	0.897	0.790	0.833	0.941	0.884	0.851
1500	2	1	2	0.840	0.887	0.937	0.862	0.854	0.822	0.503	0.878
1500	2	1	3	0.897	0.925	0.944	0.879	0.906	0.961	0.893	0.914
1500	2	1	4	0.049	0.395	0.583	0.087	0.024	0.134	0.144	0.258
1500	2	2	1	0.710	0.769	0.785	0.734	0.763	0.832	0.843	0.752
1500	2	2	2	0.761	0.783	0.812	0.786	0.786	0.724	0.632	0.783
1500	2	2	3	0.803	0.832	0.848	0.818	0.835	0.861	0.851	0.827
1500	2	2	4	0.115	0.285	0.372	0.171	0.140	0.239	0.324	0.228
1500	2	3	1	0.606	0.685	0.720	0.688	0.706	0.741	0.726	0.676
1500	2	3	2	0.642	0.671	0.703	0.698	0.706	0.625	0.564	0.678
1500	2	3	3	0.687	0.751	0.783	0.764	0.770	0.773	0.734	0.746
1500	2	3	4	0.120	0.231	0.291	0.185	0.192	0.235	0.319	0.205
1500	2	4	1	0.548	0.627	0.680	0.659	0.669	0.679	0.656	0.629
1500	2	4	2	0.575	0.591	0.629	0.636	0.643	0.553	0.514	0.607
1500	2	4	3	0.621	0.694	0.743	0.732	0.729	0.713	0.663	0.696
1500	2	4	4	0.116	0.198	0.248	0.179	0.200	0.216	0.300	0.186
1500	2	5	1	0.517	0.588	0.650	0.641	0.641	0.635	0.618	0.598
1500	2	5	2	0.540	0.538	0.578	0.593	0.594	0.503	0.486	0.562
1500	2	5	3	0.585	0.654	0.714	0.714	0.700	0.671	0.625	0.665
1500	2	5	4	0.112	0.177	0.221	0.169	0.195	0.199	0.287	0.171
1500	2	6	1	0.499	0.560	0.627	0.628	0.620	0.605	0.596	0.578
1500	2	6	2	0.520	0.502	0.542	0.564	0.558	0.470	0.469	0.531
1500	2	6	3	0.564	0.626	0.693	0.704	0.680	0.642	0.603	0.644
1500	2	6	4	0.110	0.163	0.203	0.160	0.187	0.187	0.279	0.161
1500	2	7	1	0.488	0.541	0.610	0.619	0.603	0.584	0.582	0.563
1500	2	7	2	0.507	0.479	0.517	0.544	0.532	0.448	0.459	0.511
1500	2	7	3	0.552	0.606	0.677	0.697	0.664	0.621	0.589	0.630
1500	2	7	4	0.108	0.155	0.190	0.154	0.180	0.178	0.273	0.153
1500	2	8	1	0.480	0.528	0.597	0.611	0.591	0.569	0.573	0.552
1500	2	8	2	0.499	0.462	0.499	0.530	0.513	0.432	0.452	0.496
1500	2	8	3	0.543	0.593	0.666	0.693	0.653	0.607	0.580	0.620
1500	2	8	4	0.107	0.149	0.181	0.148	0.174	0.172	0.270	0.148
1500	2	9	1	0.475	0.518	0.587	0.606	0.581	0.559	0.567	0.545
1500	2	9	2	0.493	0.450	0.486	0.521	0.499	0.421	0.447	0.486
1500	2	9	3	0.538	0.583	0.657	0.690	0.644	0.597	0.574	0.612
1500	2	9	4	0.106	0.144	0.174	0.144	0.170	0.168	0.267	0.144
1500	2	10	1	0.472	0.511	0.579	0.602	0.574	0.551	0.563	0.539

1500	2	10	2	0.489	0.442	0.477	0.514	0.489	0.413	0.444	0.479
1500	2	10	3	0.533	0.575	0.651	0.688	0.638	0.589	0.570	0.607
1500	2	10	4	0.106	0.141	0.169	0.141	0.166	0.164	0.266	0.141
1500	2	11	1	0.456	0.478	0.540	0.578	0.536	0.514	0.543	0.510
1500	2	11	2	0.471	0.403	0.432	0.485	0.442	0.376	0.428	0.445
1500	2	11	3	0.515	0.541	0.618	0.680	0.606	0.553	0.550	0.582
1500	2	11	4	0.103	0.127	0.146	0.126	0.148	0.150	0.258	0.127
2000	1	1	1	0.613	0.760	0.779	0.700	0.742	0.917	0.942	0.717
2000	1	1	2	0.882	0.891	0.907	0.879	0.880	0.934	0.944	0.891
2000	1	1	3	0.882	0.891	0.907	0.879	0.880	0.935	0.944	0.891
2000	1	1	4	0.303	0.310	0.266	0.001	0.226	0.829	0.928	0.251
2000	1	2	1	0.567	0.656	0.716	0.621	0.672	0.776	0.774	0.645
2000	1	2	2	0.732	0.772	0.812	0.759	0.770	0.810	0.780	0.770
2000	1	2	3	0.732	0.774	0.816	0.759	0.774	0.813	0.781	0.772
2000	1	2	4	0.222	0.323	0.313	0.053	0.283	0.601	0.727	0.251
2000	1	3	1	0.512	0.601	0.679	0.592	0.642	0.713	0.682	0.601
2000	1	3	2	0.651	0.715	0.767	0.719	0.722	0.746	0.688	0.712
2000	1	3	3	0.651	0.725	0.779	0.721	0.733	0.757	0.690	0.719
2000	1	3	4	0.181	0.311	0.324	0.113	0.301	0.520	0.625	0.250
2000	1	4	1	0.484	0.564	0.646	0.570	0.614	0.670	0.639	0.570
2000	1	4	2	0.612	0.680	0.733	0.699	0.685	0.706	0.645	0.679
2000	1	4	3	0.612	0.697	0.754	0.704	0.706	0.725	0.647	0.691
2000	1	4	4	0.164	0.296	0.318	0.145	0.302	0.475	0.579	0.245
2000	1	5	1	0.469	0.540	0.620	0.551	0.591	0.641	0.617	0.549
2000	1	5	2	0.591	0.658	0.710	0.686	0.659	0.681	0.623	0.658
2000	1	5	3	0.591	0.680	0.739	0.697	0.689	0.705	0.625	0.675
2000	1	5	4	0.155	0.284	0.308	0.160	0.295	0.447	0.556	0.239
2000	1	6	1	0.460	0.524	0.600	0.536	0.572	0.622	0.604	0.534
2000	1	6	2	0.580	0.644	0.695	0.679	0.643	0.665	0.610	0.645
2000	1	6	3	0.580	0.670	0.730	0.695	0.679	0.693	0.612	0.666
2000	1	6	4	0.150	0.276	0.298	0.165	0.288	0.430	0.542	0.233
2000	1	7	1	0.454	0.514	0.584	0.523	0.558	0.610	0.596	0.523
2000	1	7	2	0.572	0.635	0.685	0.675	0.633	0.654	0.602	0.637
2000	1	7	3	0.572	0.663	0.725	0.695	0.674	0.685	0.604	0.661
2000	1	7	4	0.147	0.270	0.290	0.167	0.280	0.418	0.534	0.229
2000	1	8	1	0.451	0.507	0.572	0.513	0.547	0.601	0.591	0.514
2000	1	8	2	0.568	0.629	0.679	0.673	0.626	0.647	0.597	0.632
2000	1	8	3	0.568	0.659	0.722	0.696	0.672	0.680	0.599	0.658
2000	1	8	4	0.145	0.266	0.284	0.167	0.274	0.410	0.529	0.225
2000	1	9	1	0.448	0.501	0.562	0.505	0.538	0.594	0.587	0.508
2000	1	9	2	0.564	0.624	0.675	0.672	0.622	0.642	0.594	0.629
2000	1	9	3	0.564	0.655	0.721	0.698	0.670	0.676	0.596	0.656
2000	1	9	4	0.144	0.263	0.278	0.167	0.270	0.404	0.525	0.222
2000	1	10	1	0.446	0.498	0.555	0.498	0.531	0.589	0.585	0.503
2000	1	10	2	0.562	0.621	0.672	0.671	0.619	0.638	0.591	0.626
2000	1	10	3	0.562	0.653	0.720	0.699	0.669	0.673	0.593	0.654
2000	1	10	4	0.143	0.261	0.274	0.166	0.266	0.399	0.522	0.220
2000	1	11	1	0.438	0.480	0.516	0.460	0.495	0.567	0.573	0.478
2000	1	11	2	0.551	0.606	0.662	0.674	0.609	0.620	0.580	0.617
2000	1	11	3	0.551	0.642	0.719	0.712	0.670	0.659	0.582	0.651
2000	1	11	4	0.139	0.250	0.252	0.158	0.245	0.379	0.511	0.207
2000	2	1	1	0.813	0.878	0.897	0.783	0.832	0.940	0.878	0.847
2000	2	1	2	0.840	0.885	0.937	0.855	0.854	0.822	0.498	0.877
2000	2	1	3	0.893	0.920	0.944	0.872	0.905	0.960	0.887	0.910
2000	2	1	4	0.046	0.391	0.583	0.086	0.023	0.133	0.143	0.257
2000	2	2	1	0.700	0.764	0.785	0.730	0.762	0.831	0.839	0.747
2000	2	2	2	0.758	0.780	0.812	0.781	0.785	0.723	0.627	0.781
2000	2	2	3	0.799	0.827	0.848	0.813	0.834	0.860	0.848	0.824
2000	2	2	4	0.094	0.280	0.372	0.169	0.140	0.236	0.322	0.221
2000	2	3	1	0.597	0.679	0.719	0.684	0.705	0.740	0.723	0.671
2000	2	3	2	0.639	0.669	0.703	0.693	0.705	0.624	0.561	0.675

2000	2	3	3	0.683	0.747	0.782	0.758	0.769	0.772	0.731	0.743
2000	2	3	4	0.097	0.227	0.291	0.184	0.191	0.233	0.317	0.197
2000	2	4	1	0.539	0.621	0.678	0.654	0.668	0.677	0.654	0.624
2000	2	4	2	0.573	0.589	0.629	0.630	0.642	0.551	0.512	0.605
2000	2	4	3	0.617	0.690	0.742	0.726	0.728	0.711	0.661	0.693
2000	2	4	4	0.093	0.195	0.248	0.178	0.199	0.214	0.298	0.179
2000	2	5	1	0.509	0.582	0.648	0.636	0.640	0.633	0.616	0.594
2000	2	5	2	0.537	0.536	0.578	0.587	0.593	0.502	0.483	0.559
2000	2	5	3	0.581	0.650	0.713	0.708	0.699	0.669	0.623	0.661
2000	2	5	4	0.090	0.174	0.221	0.168	0.194	0.197	0.285	0.164
2000	2	6	1	0.491	0.554	0.625	0.623	0.618	0.603	0.594	0.573
2000	2	6	2	0.517	0.501	0.542	0.558	0.557	0.469	0.467	0.529
2000	2	6	3	0.561	0.622	0.692	0.698	0.678	0.640	0.602	0.641
2000	2	6	4	0.089	0.161	0.203	0.160	0.186	0.185	0.277	0.154
2000	2	7	1	0.480	0.536	0.608	0.614	0.602	0.582	0.581	0.558
2000	2	7	2	0.504	0.477	0.517	0.539	0.531	0.447	0.457	0.509
2000	2	7	3	0.548	0.603	0.676	0.691	0.663	0.620	0.588	0.626
2000	2	7	4	0.087	0.153	0.190	0.153	0.179	0.176	0.272	0.147
2000	2	8	1	0.473	0.522	0.595	0.607	0.589	0.568	0.572	0.548
2000	2	8	2	0.496	0.460	0.499	0.525	0.512	0.431	0.450	0.494
2000	2	8	3	0.540	0.589	0.664	0.687	0.652	0.605	0.579	0.616
2000	2	8	4	0.086	0.147	0.181	0.148	0.173	0.170	0.268	0.142
2000	2	9	1	0.468	0.513	0.585	0.601	0.580	0.557	0.566	0.540
2000	2	9	2	0.490	0.449	0.486	0.516	0.499	0.420	0.445	0.484
2000	2	9	3	0.534	0.579	0.656	0.684	0.643	0.595	0.573	0.609
2000	2	9	4	0.086	0.142	0.174	0.144	0.169	0.166	0.266	0.138
2000	2	10	1	0.464	0.506	0.577	0.597	0.572	0.549	0.561	0.534
2000	2	10	2	0.486	0.440	0.477	0.509	0.488	0.412	0.441	0.477
2000	2	10	3	0.530	0.571	0.649	0.682	0.636	0.587	0.568	0.604
2000	2	10	4	0.085	0.139	0.169	0.140	0.165	0.163	0.264	0.135
2000	2	11	1	0.448	0.473	0.538	0.573	0.535	0.513	0.542	0.506
2000	2	11	2	0.468	0.401	0.432	0.480	0.441	0.375	0.427	0.443
2000	2	11	3	0.512	0.537	0.617	0.674	0.605	0.551	0.549	0.579
2000	2	11	4	0.083	0.125	0.146	0.125	0.147	0.148	0.256	0.121
2500	1	1	1	0.607	0.752	0.776	0.700	0.742	0.917	0.942	0.713
2500	1	1	2	0.873	0.883	0.907	0.879	0.880	0.934	0.944	0.887
2500	1	1	3	0.873	0.883	0.907	0.879	0.880	0.935	0.944	0.887
2500	1	1	4	0.292	0.287	0.257	0.001	0.226	0.829	0.928	0.241
2500	1	2	1	0.561	0.650	0.713	0.621	0.672	0.776	0.774	0.642
2500	1	2	2	0.717	0.769	0.812	0.758	0.770	0.810	0.780	0.765
2500	1	2	3	0.717	0.771	0.816	0.758	0.774	0.813	0.781	0.767
2500	1	2	4	0.213	0.306	0.310	0.053	0.283	0.601	0.727	0.244
2500	1	3	1	0.507	0.596	0.674	0.592	0.641	0.713	0.682	0.597
2500	1	3	2	0.635	0.713	0.766	0.717	0.722	0.746	0.688	0.707
2500	1	3	3	0.636	0.723	0.778	0.718	0.733	0.757	0.690	0.714
2500	1	3	4	0.173	0.299	0.321	0.113	0.301	0.520	0.625	0.244
2500	1	4	1	0.479	0.560	0.640	0.570	0.614	0.670	0.639	0.567
2500	1	4	2	0.597	0.678	0.732	0.695	0.685	0.705	0.645	0.673
2500	1	4	3	0.597	0.695	0.753	0.700	0.705	0.724	0.647	0.685
2500	1	4	4	0.156	0.286	0.316	0.145	0.302	0.475	0.579	0.240
2500	1	5	1	0.464	0.536	0.613	0.551	0.590	0.641	0.617	0.545
2500	1	5	2	0.577	0.656	0.708	0.682	0.659	0.680	0.623	0.653
2500	1	5	3	0.577	0.678	0.737	0.693	0.688	0.704	0.625	0.669
2500	1	5	4	0.148	0.275	0.307	0.160	0.295	0.447	0.556	0.235
2500	1	6	1	0.455	0.521	0.592	0.536	0.572	0.622	0.604	0.530
2500	1	6	2	0.565	0.643	0.693	0.675	0.643	0.663	0.610	0.640
2500	1	6	3	0.565	0.668	0.728	0.690	0.679	0.691	0.612	0.660
2500	1	6	4	0.143	0.267	0.297	0.165	0.288	0.430	0.542	0.229
2500	1	7	1	0.450	0.510	0.577	0.523	0.557	0.609	0.596	0.519
2500	1	7	2	0.558	0.634	0.683	0.671	0.633	0.652	0.602	0.632
2500	1	7	3	0.558	0.661	0.723	0.690	0.674	0.683	0.604	0.655

2500	1	7	4	0.140	0.262	0.289	0.167	0.280	0.418	0.534	0.225
2500	1	8	1	0.446	0.503	0.564	0.513	0.546	0.600	0.591	0.510
2500	1	8	2	0.553	0.627	0.677	0.668	0.626	0.645	0.597	0.627
2500	1	8	3	0.553	0.657	0.720	0.691	0.671	0.677	0.599	0.652
2500	1	8	4	0.138	0.258	0.282	0.167	0.274	0.410	0.529	0.221
2500	1	9	1	0.443	0.498	0.555	0.505	0.538	0.594	0.587	0.504
2500	1	9	2	0.550	0.623	0.673	0.667	0.622	0.639	0.594	0.623
2500	1	9	3	0.550	0.654	0.718	0.693	0.669	0.673	0.596	0.650
2500	1	9	4	0.137	0.255	0.277	0.167	0.270	0.404	0.525	0.218
2500	1	10	1	0.442	0.494	0.548	0.498	0.531	0.589	0.585	0.499
2500	1	10	2	0.548	0.620	0.670	0.667	0.619	0.635	0.591	0.621
2500	1	10	3	0.548	0.651	0.717	0.694	0.669	0.670	0.593	0.649
2500	1	10	4	0.136	0.253	0.273	0.166	0.266	0.399	0.522	0.216
2500	1	11	1	0.434	0.477	0.509	0.459	0.494	0.566	0.573	0.474
2500	1	11	2	0.537	0.605	0.660	0.669	0.609	0.617	0.580	0.612
2500	1	11	3	0.537	0.640	0.716	0.707	0.669	0.656	0.582	0.645
2500	1	11	4	0.132	0.243	0.251	0.158	0.245	0.379	0.511	0.204
2500	2	1	1	0.797	0.873	0.896	0.781	0.831	0.937	0.869	0.840
2500	2	1	2	0.829	0.881	0.936	0.853	0.854	0.815	0.483	0.872
2500	2	1	3	0.879	0.916	0.943	0.870	0.905	0.959	0.878	0.905
2500	2	1	4	0.039	0.371	0.578	0.083	0.023	0.133	0.142	0.249
2500	2	2	1	0.687	0.759	0.783	0.727	0.761	0.829	0.833	0.742
2500	2	2	2	0.746	0.778	0.811	0.778	0.782	0.719	0.614	0.776
2500	2	2	3	0.784	0.824	0.847	0.810	0.833	0.858	0.842	0.818
2500	2	2	4	0.081	0.268	0.366	0.167	0.138	0.234	0.320	0.213
2500	2	3	1	0.587	0.675	0.716	0.681	0.703	0.737	0.719	0.666
2500	2	3	2	0.628	0.668	0.701	0.690	0.701	0.621	0.551	0.671
2500	2	3	3	0.670	0.744	0.781	0.755	0.768	0.770	0.727	0.737
2500	2	3	4	0.086	0.218	0.286	0.182	0.188	0.230	0.316	0.191
2500	2	4	1	0.530	0.618	0.673	0.652	0.666	0.675	0.650	0.619
2500	2	4	2	0.562	0.588	0.627	0.627	0.638	0.548	0.503	0.601
2500	2	4	3	0.605	0.687	0.739	0.723	0.726	0.709	0.658	0.687
2500	2	4	4	0.083	0.188	0.245	0.177	0.197	0.211	0.296	0.173
2500	2	5	1	0.500	0.578	0.642	0.634	0.638	0.631	0.613	0.588
2500	2	5	2	0.527	0.535	0.575	0.584	0.590	0.499	0.475	0.555
2500	2	5	3	0.570	0.647	0.709	0.705	0.698	0.667	0.621	0.656
2500	2	5	4	0.081	0.169	0.218	0.167	0.192	0.194	0.284	0.159
2500	2	6	1	0.483	0.551	0.618	0.621	0.617	0.601	0.592	0.568
2500	2	6	2	0.507	0.500	0.539	0.555	0.554	0.466	0.459	0.525
2500	2	6	3	0.550	0.620	0.687	0.694	0.677	0.637	0.599	0.635
2500	2	6	4	0.079	0.156	0.200	0.159	0.185	0.182	0.276	0.150
2500	2	7	1	0.472	0.532	0.601	0.612	0.600	0.580	0.578	0.553
2500	2	7	2	0.495	0.476	0.513	0.536	0.529	0.444	0.449	0.504
2500	2	7	3	0.538	0.600	0.670	0.687	0.661	0.617	0.585	0.621
2500	2	7	4	0.078	0.148	0.187	0.152	0.178	0.174	0.271	0.143
2500	2	8	1	0.465	0.519	0.587	0.604	0.588	0.566	0.569	0.543
2500	2	8	2	0.487	0.460	0.495	0.522	0.510	0.428	0.443	0.490
2500	2	8	3	0.530	0.586	0.659	0.683	0.650	0.603	0.576	0.611
2500	2	8	4	0.078	0.142	0.178	0.147	0.172	0.168	0.267	0.137
2500	2	9	1	0.460	0.510	0.577	0.599	0.578	0.555	0.563	0.535
2500	2	9	2	0.481	0.448	0.482	0.513	0.496	0.417	0.438	0.480
2500	2	9	3	0.524	0.576	0.650	0.680	0.641	0.592	0.570	0.604
2500	2	9	4	0.077	0.138	0.172	0.143	0.167	0.164	0.265	0.134
2500	2	10	1	0.457	0.503	0.569	0.595	0.570	0.547	0.559	0.529
2500	2	10	2	0.477	0.439	0.472	0.506	0.486	0.409	0.435	0.472
2500	2	10	3	0.520	0.569	0.643	0.678	0.635	0.584	0.566	0.598
2500	2	10	4	0.077	0.135	0.167	0.140	0.164	0.161	0.263	0.131
2500	2	11	1	0.441	0.470	0.530	0.571	0.533	0.511	0.540	0.500
2500	2	11	2	0.460	0.401	0.428	0.478	0.439	0.373	0.420	0.439
2500	2	11	3	0.502	0.535	0.610	0.670	0.603	0.548	0.546	0.574
2500	2	11	4	0.075	0.122	0.144	0.125	0.146	0.146	0.255	0.118

3000	1	1	1	0.582	0.745	0.776	0.700	0.742	0.917	0.942	0.705
3000	1	1	2	0.856	0.881	0.907	0.879	0.880	0.934	0.944	0.882
3000	1	1	3	0.856	0.881	0.907	0.879	0.880	0.935	0.944	0.882
3000	1	1	4	0.278	0.260	0.257	0.001	0.226	0.829	0.928	0.231
3000	1	2	1	0.542	0.645	0.712	0.618	0.672	0.776	0.774	0.635
3000	1	2	2	0.694	0.768	0.812	0.754	0.770	0.809	0.779	0.758
3000	1	2	3	0.694	0.770	0.816	0.754	0.774	0.812	0.780	0.759
3000	1	2	4	0.201	0.289	0.308	0.053	0.283	0.601	0.727	0.237
3000	1	3	1	0.491	0.593	0.671	0.585	0.641	0.711	0.682	0.590
3000	1	3	2	0.614	0.712	0.765	0.705	0.722	0.744	0.688	0.699
3000	1	3	3	0.614	0.722	0.777	0.706	0.733	0.755	0.690	0.705
3000	1	3	4	0.164	0.286	0.320	0.113	0.301	0.520	0.625	0.239
3000	1	4	1	0.464	0.557	0.636	0.561	0.613	0.668	0.639	0.559
3000	1	4	2	0.577	0.677	0.730	0.679	0.685	0.703	0.645	0.665
3000	1	4	3	0.577	0.694	0.751	0.685	0.705	0.721	0.647	0.676
3000	1	4	4	0.148	0.275	0.315	0.145	0.302	0.475	0.579	0.235
3000	1	5	1	0.450	0.533	0.608	0.542	0.590	0.639	0.617	0.538
3000	1	5	2	0.557	0.656	0.707	0.665	0.659	0.677	0.623	0.644
3000	1	5	3	0.557	0.677	0.735	0.675	0.688	0.701	0.625	0.660
3000	1	5	4	0.140	0.266	0.305	0.160	0.295	0.447	0.556	0.230
3000	1	6	1	0.442	0.518	0.587	0.527	0.571	0.620	0.604	0.523
3000	1	6	2	0.546	0.642	0.691	0.657	0.643	0.661	0.610	0.631
3000	1	6	3	0.546	0.667	0.726	0.672	0.678	0.688	0.612	0.651
3000	1	6	4	0.135	0.258	0.296	0.165	0.288	0.430	0.542	0.225
3000	1	7	1	0.436	0.508	0.571	0.514	0.557	0.607	0.596	0.512
3000	1	7	2	0.539	0.633	0.682	0.653	0.633	0.650	0.602	0.623
3000	1	7	3	0.539	0.660	0.721	0.672	0.673	0.680	0.604	0.646
3000	1	7	4	0.133	0.253	0.288	0.167	0.280	0.418	0.534	0.221
3000	1	8	1	0.433	0.500	0.559	0.504	0.546	0.598	0.591	0.503
3000	1	8	2	0.534	0.627	0.676	0.651	0.626	0.642	0.597	0.618
3000	1	8	3	0.534	0.656	0.718	0.673	0.670	0.674	0.599	0.643
3000	1	8	4	0.131	0.250	0.281	0.167	0.274	0.410	0.529	0.217
3000	1	9	1	0.431	0.495	0.549	0.495	0.537	0.591	0.587	0.497
3000	1	9	2	0.531	0.622	0.671	0.650	0.622	0.637	0.593	0.615
3000	1	9	3	0.531	0.652	0.716	0.675	0.669	0.670	0.595	0.641
3000	1	9	4	0.130	0.247	0.276	0.167	0.270	0.404	0.525	0.214
3000	1	10	1	0.429	0.491	0.542	0.489	0.530	0.586	0.585	0.492
3000	1	10	2	0.529	0.619	0.669	0.649	0.619	0.633	0.591	0.612
3000	1	10	3	0.529	0.650	0.715	0.676	0.668	0.667	0.593	0.639
3000	1	10	4	0.129	0.245	0.272	0.166	0.266	0.399	0.522	0.212
3000	1	11	1	0.421	0.474	0.503	0.451	0.494	0.564	0.573	0.467
3000	1	11	2	0.519	0.604	0.659	0.653	0.609	0.615	0.579	0.603
3000	1	11	3	0.519	0.639	0.713	0.690	0.668	0.653	0.581	0.636
3000	1	11	4	0.125	0.236	0.249	0.158	0.245	0.379	0.511	0.200
3000	2	1	1	0.788	0.869	0.894	0.781	0.831	0.933	0.854	0.837
3000	2	1	2	0.828	0.880	0.935	0.853	0.854	0.809	0.440	0.871
3000	2	1	3	0.874	0.914	0.942	0.870	0.904	0.955	0.863	0.903
3000	2	1	4	0.037	0.367	0.569	0.083	0.023	0.132	0.141	0.245
3000	2	2	1	0.673	0.755	0.780	0.727	0.759	0.825	0.826	0.736
3000	2	2	2	0.733	0.777	0.809	0.777	0.781	0.713	0.594	0.772
3000	2	2	3	0.770	0.822	0.845	0.810	0.832	0.855	0.835	0.813
3000	2	2	4	0.075	0.260	0.360	0.167	0.136	0.230	0.317	0.208
3000	2	3	1	0.572	0.672	0.712	0.679	0.702	0.734	0.715	0.660
3000	2	3	2	0.613	0.667	0.700	0.687	0.700	0.615	0.538	0.665
3000	2	3	3	0.654	0.742	0.778	0.752	0.767	0.766	0.723	0.731
3000	2	3	4	0.079	0.211	0.282	0.182	0.186	0.226	0.312	0.186
3000	2	4	1	0.517	0.614	0.669	0.649	0.665	0.671	0.647	0.613
3000	2	4	2	0.548	0.587	0.625	0.623	0.637	0.543	0.492	0.595
3000	2	4	3	0.590	0.685	0.736	0.718	0.725	0.705	0.654	0.681
3000	2	4	4	0.077	0.182	0.241	0.177	0.195	0.207	0.293	0.169
3000	2	5	1	0.487	0.575	0.638	0.630	0.637	0.628	0.610	0.582

3000	2	5	2	0.513	0.534	0.573	0.579	0.588	0.494	0.466	0.549
3000	2	5	3	0.555	0.645	0.706	0.698	0.696	0.663	0.617	0.649
3000	2	5	4	0.075	0.164	0.215	0.167	0.191	0.191	0.280	0.156
3000	2	6	1	0.470	0.548	0.614	0.617	0.615	0.598	0.588	0.562
3000	2	6	2	0.493	0.499	0.537	0.550	0.553	0.461	0.450	0.519
3000	2	6	3	0.536	0.617	0.684	0.687	0.675	0.634	0.596	0.629
3000	2	6	4	0.073	0.152	0.198	0.159	0.183	0.179	0.273	0.146
3000	2	7	1	0.460	0.529	0.596	0.608	0.599	0.577	0.575	0.547
3000	2	7	2	0.481	0.476	0.512	0.530	0.527	0.439	0.441	0.499
3000	2	7	3	0.523	0.598	0.667	0.681	0.660	0.614	0.582	0.614
3000	2	7	4	0.073	0.143	0.185	0.152	0.176	0.171	0.267	0.139
3000	2	8	1	0.453	0.516	0.583	0.600	0.586	0.563	0.566	0.537
3000	2	8	2	0.473	0.459	0.494	0.517	0.509	0.424	0.434	0.485
3000	2	8	3	0.515	0.584	0.655	0.676	0.648	0.600	0.573	0.604
3000	2	8	4	0.072	0.138	0.176	0.147	0.171	0.166	0.264	0.134
3000	2	9	1	0.448	0.507	0.572	0.595	0.576	0.552	0.560	0.529
3000	2	9	2	0.468	0.448	0.480	0.508	0.495	0.413	0.430	0.474
3000	2	9	3	0.510	0.574	0.646	0.673	0.640	0.589	0.567	0.597
3000	2	9	4	0.071	0.134	0.170	0.143	0.166	0.161	0.262	0.131
3000	2	10	1	0.445	0.500	0.565	0.591	0.569	0.544	0.556	0.523
3000	2	10	2	0.464	0.439	0.471	0.501	0.485	0.405	0.427	0.467
3000	2	10	3	0.506	0.567	0.639	0.671	0.633	0.581	0.563	0.592
3000	2	10	4	0.071	0.131	0.165	0.140	0.163	0.158	0.260	0.128
3000	2	11	1	0.430	0.467	0.526	0.567	0.531	0.508	0.537	0.495
3000	2	11	2	0.446	0.401	0.426	0.473	0.438	0.369	0.412	0.434
3000	2	11	3	0.489	0.533	0.606	0.664	0.601	0.545	0.544	0.567
3000	2	11	4	0.070	0.118	0.142	0.125	0.145	0.144	0.252	0.115
3500	1	1	1	0.503	0.738	0.775	0.700	0.742	0.917	0.942	0.682
3500	1	1	2	0.773	0.877	0.907	0.879	0.880	0.934	0.944	0.858
3500	1	1	3	0.773	0.877	0.907	0.879	0.880	0.935	0.944	0.858
3500	1	1	4	0.252	0.232	0.254	0.001	0.226	0.829	0.928	0.218
3500	1	2	1	0.440	0.640	0.711	0.617	0.672	0.776	0.774	0.605
3500	1	2	2	0.581	0.763	0.812	0.752	0.770	0.809	0.779	0.725
3500	1	2	3	0.581	0.765	0.816	0.752	0.774	0.812	0.780	0.727
3500	1	2	4	0.184	0.274	0.305	0.053	0.283	0.601	0.727	0.228
3500	1	3	1	0.389	0.587	0.670	0.583	0.641	0.711	0.682	0.561
3500	1	3	2	0.500	0.707	0.765	0.701	0.722	0.744	0.688	0.666
3500	1	3	3	0.500	0.716	0.777	0.703	0.733	0.755	0.689	0.672
3500	1	3	4	0.150	0.276	0.317	0.113	0.301	0.520	0.625	0.232
3500	1	4	1	0.365	0.551	0.634	0.559	0.613	0.668	0.639	0.530
3500	1	4	2	0.464	0.672	0.730	0.675	0.685	0.703	0.645	0.632
3500	1	4	3	0.464	0.688	0.751	0.680	0.705	0.721	0.647	0.643
3500	1	4	4	0.135	0.266	0.313	0.145	0.302	0.475	0.579	0.230
3500	1	5	1	0.352	0.527	0.606	0.540	0.590	0.639	0.617	0.509
3500	1	5	2	0.446	0.651	0.707	0.661	0.659	0.677	0.623	0.612
3500	1	5	3	0.446	0.672	0.735	0.671	0.687	0.701	0.624	0.628
3500	1	5	4	0.128	0.258	0.304	0.160	0.295	0.447	0.556	0.225
3500	1	6	1	0.344	0.512	0.585	0.524	0.571	0.620	0.604	0.494
3500	1	6	2	0.435	0.637	0.691	0.653	0.643	0.661	0.610	0.599
3500	1	6	3	0.435	0.661	0.725	0.667	0.678	0.688	0.612	0.619
3500	1	6	4	0.124	0.251	0.294	0.165	0.288	0.430	0.542	0.220
3500	1	7	1	0.340	0.502	0.569	0.512	0.556	0.607	0.596	0.483
3500	1	7	2	0.429	0.628	0.682	0.648	0.633	0.650	0.602	0.591
3500	1	7	3	0.429	0.654	0.720	0.667	0.672	0.680	0.604	0.614
3500	1	7	4	0.121	0.246	0.286	0.167	0.280	0.418	0.534	0.216
3500	1	8	1	0.337	0.495	0.556	0.501	0.545	0.597	0.591	0.475
3500	1	8	2	0.425	0.622	0.676	0.646	0.626	0.642	0.597	0.586
3500	1	8	3	0.425	0.650	0.717	0.668	0.670	0.674	0.599	0.611
3500	1	8	4	0.120	0.243	0.280	0.167	0.274	0.410	0.529	0.213
3500	1	9	1	0.335	0.489	0.547	0.493	0.536	0.591	0.587	0.468
3500	1	9	2	0.422	0.617	0.671	0.645	0.622	0.637	0.593	0.583

3500	1	9	3	0.422	0.647	0.715	0.670	0.668	0.670	0.595	0.609
3500	1	9	4	0.119	0.241	0.275	0.167	0.270	0.404	0.525	0.210
3500	1	10	1	0.333	0.486	0.539	0.487	0.529	0.586	0.585	0.464
3500	1	10	2	0.420	0.614	0.669	0.645	0.619	0.633	0.591	0.581
3500	1	10	3	0.420	0.644	0.714	0.671	0.667	0.667	0.592	0.607
3500	1	10	4	0.118	0.239	0.271	0.166	0.266	0.399	0.522	0.208
3500	1	11	1	0.326	0.468	0.500	0.449	0.493	0.563	0.573	0.439
3500	1	11	2	0.411	0.599	0.659	0.649	0.609	0.615	0.579	0.572
3500	1	11	3	0.411	0.633	0.712	0.685	0.667	0.653	0.581	0.604
3500	1	11	4	0.114	0.230	0.248	0.158	0.245	0.379	0.511	0.196
3500	2	1	1	0.778	0.862	0.893	0.780	0.830	0.931	0.839	0.832
3500	2	1	2	0.823	0.874	0.935	0.852	0.854	0.808	0.403	0.868
3500	2	1	3	0.866	0.909	0.941	0.870	0.904	0.954	0.847	0.899
3500	2	1	4	0.036	0.334	0.566	0.081	0.023	0.132	0.138	0.237
3500	2	2	1	0.633	0.750	0.779	0.726	0.758	0.823	0.817	0.723
3500	2	2	2	0.693	0.773	0.809	0.777	0.778	0.710	0.568	0.759
3500	2	2	3	0.727	0.818	0.844	0.809	0.831	0.853	0.825	0.800
3500	2	2	4	0.067	0.243	0.354	0.165	0.134	0.230	0.312	0.200
3500	2	3	1	0.527	0.666	0.710	0.678	0.700	0.732	0.708	0.645
3500	2	3	2	0.565	0.663	0.699	0.686	0.697	0.612	0.520	0.651
3500	2	3	3	0.604	0.738	0.777	0.750	0.765	0.764	0.716	0.716
3500	2	3	4	0.071	0.200	0.277	0.181	0.183	0.225	0.308	0.180
3500	2	4	1	0.472	0.609	0.666	0.647	0.663	0.669	0.641	0.598
3500	2	4	2	0.499	0.584	0.624	0.621	0.634	0.540	0.477	0.580
3500	2	4	3	0.540	0.681	0.734	0.715	0.724	0.704	0.649	0.665
3500	2	4	4	0.069	0.174	0.238	0.176	0.192	0.206	0.289	0.164
3500	2	5	1	0.443	0.570	0.634	0.628	0.635	0.626	0.605	0.568
3500	2	5	2	0.465	0.531	0.572	0.578	0.586	0.491	0.452	0.535
3500	2	5	3	0.506	0.641	0.703	0.696	0.695	0.661	0.612	0.634
3500	2	5	4	0.067	0.157	0.212	0.166	0.188	0.190	0.276	0.151
3500	2	6	1	0.427	0.543	0.610	0.615	0.613	0.596	0.584	0.547
3500	2	6	2	0.446	0.496	0.536	0.548	0.550	0.458	0.438	0.505
3500	2	6	3	0.487	0.613	0.680	0.685	0.674	0.632	0.591	0.613
3500	2	6	4	0.066	0.145	0.195	0.158	0.180	0.178	0.269	0.142
3500	2	7	1	0.417	0.524	0.592	0.606	0.597	0.575	0.571	0.533
3500	2	7	2	0.434	0.473	0.510	0.529	0.525	0.437	0.428	0.485
3500	2	7	3	0.476	0.594	0.664	0.678	0.658	0.612	0.578	0.599
3500	2	7	4	0.065	0.138	0.183	0.151	0.174	0.170	0.264	0.135
3500	2	8	1	0.410	0.511	0.579	0.598	0.584	0.561	0.562	0.523
3500	2	8	2	0.427	0.457	0.492	0.515	0.506	0.421	0.422	0.470
3500	2	8	3	0.468	0.580	0.652	0.673	0.646	0.598	0.569	0.589
3500	2	8	4	0.065	0.133	0.174	0.146	0.168	0.164	0.260	0.130
3500	2	9	1	0.406	0.502	0.569	0.593	0.574	0.550	0.556	0.515
3500	2	9	2	0.421	0.445	0.479	0.506	0.493	0.411	0.418	0.460
3500	2	9	3	0.463	0.570	0.643	0.670	0.638	0.587	0.563	0.582
3500	2	9	4	0.064	0.129	0.168	0.142	0.164	0.160	0.258	0.127
3500	2	10	1	0.402	0.495	0.561	0.589	0.567	0.542	0.552	0.509
3500	2	10	2	0.418	0.436	0.469	0.499	0.483	0.403	0.415	0.453
3500	2	10	3	0.459	0.563	0.636	0.668	0.631	0.579	0.559	0.577
3500	2	10	4	0.064	0.126	0.163	0.139	0.160	0.157	0.256	0.124
3500	2	11	1	0.388	0.463	0.522	0.565	0.529	0.506	0.533	0.481
3500	2	11	2	0.401	0.398	0.424	0.471	0.436	0.367	0.401	0.420
3500	2	11	3	0.443	0.528	0.603	0.661	0.599	0.544	0.540	0.552
3500	2	11	4	0.063	0.114	0.141	0.124	0.143	0.143	0.249	0.111
4000	1	1	1	0.491	0.733	0.770	0.700	0.742	0.917	0.942	0.676
4000	1	1	2	0.758	0.865	0.901	0.879	0.880	0.934	0.944	0.850
4000	1	1	3	0.758	0.865	0.901	0.879	0.880	0.935	0.944	0.850
4000	1	1	4	0.240	0.211	0.252	0.001	0.226	0.829	0.927	0.210
4000	1	2	1	0.422	0.636	0.706	0.616	0.672	0.776	0.774	0.598
4000	1	2	2	0.560	0.755	0.805	0.750	0.770	0.809	0.779	0.716
4000	1	2	3	0.560	0.757	0.809	0.750	0.774	0.812	0.780	0.718

4000	1	2	4	0.174	0.259	0.301	0.053	0.283	0.601	0.725	0.222
4000	1	3	1	0.372	0.583	0.665	0.581	0.641	0.711	0.681	0.553
4000	1	3	2	0.480	0.700	0.758	0.697	0.722	0.743	0.688	0.657
4000	1	3	3	0.480	0.709	0.770	0.698	0.733	0.754	0.689	0.663
4000	1	3	4	0.141	0.264	0.314	0.113	0.301	0.520	0.623	0.227
4000	1	4	1	0.348	0.547	0.629	0.556	0.613	0.667	0.638	0.523
4000	1	4	2	0.445	0.666	0.724	0.669	0.685	0.701	0.645	0.623
4000	1	4	3	0.445	0.681	0.744	0.674	0.704	0.719	0.647	0.634
4000	1	4	4	0.127	0.256	0.310	0.145	0.302	0.475	0.577	0.225
4000	1	5	1	0.336	0.523	0.601	0.536	0.589	0.638	0.616	0.502
4000	1	5	2	0.428	0.644	0.700	0.653	0.659	0.675	0.623	0.603
4000	1	5	3	0.428	0.665	0.728	0.663	0.687	0.698	0.624	0.618
4000	1	5	4	0.120	0.249	0.301	0.160	0.295	0.447	0.554	0.220
4000	1	6	1	0.329	0.508	0.580	0.521	0.570	0.619	0.603	0.487
4000	1	6	2	0.418	0.631	0.685	0.644	0.643	0.659	0.610	0.590
4000	1	6	3	0.418	0.654	0.719	0.659	0.677	0.685	0.612	0.609
4000	1	6	4	0.116	0.243	0.292	0.165	0.288	0.430	0.540	0.216
4000	1	7	1	0.324	0.497	0.564	0.508	0.556	0.606	0.595	0.476
4000	1	7	2	0.411	0.622	0.676	0.640	0.633	0.648	0.602	0.583
4000	1	7	3	0.411	0.648	0.713	0.659	0.672	0.677	0.604	0.604
4000	1	7	4	0.114	0.238	0.284	0.167	0.280	0.418	0.532	0.212
4000	1	8	1	0.321	0.490	0.551	0.498	0.544	0.597	0.590	0.468
4000	1	8	2	0.407	0.616	0.670	0.638	0.626	0.640	0.597	0.578
4000	1	8	3	0.407	0.643	0.710	0.659	0.669	0.671	0.599	0.601
4000	1	8	4	0.112	0.235	0.277	0.167	0.274	0.410	0.527	0.208
4000	1	9	1	0.319	0.485	0.542	0.489	0.535	0.590	0.587	0.462
4000	1	9	2	0.405	0.611	0.666	0.637	0.622	0.634	0.593	0.574
4000	1	9	3	0.405	0.640	0.709	0.661	0.667	0.667	0.595	0.599
4000	1	9	4	0.111	0.233	0.272	0.167	0.270	0.404	0.523	0.206
4000	1	10	1	0.318	0.481	0.535	0.483	0.528	0.585	0.584	0.457
4000	1	10	2	0.403	0.608	0.663	0.636	0.619	0.630	0.590	0.572
4000	1	10	3	0.403	0.638	0.708	0.662	0.666	0.664	0.592	0.598
4000	1	10	4	0.111	0.231	0.268	0.166	0.266	0.399	0.521	0.204
4000	1	11	1	0.312	0.464	0.496	0.445	0.492	0.563	0.573	0.432
4000	1	11	2	0.394	0.593	0.654	0.640	0.609	0.612	0.579	0.564
4000	1	11	3	0.394	0.627	0.706	0.676	0.666	0.649	0.581	0.595
4000	1	11	4	0.107	0.223	0.246	0.158	0.245	0.379	0.509	0.192
4000	2	1	1	0.767	0.856	0.893	0.780	0.829	0.928	0.819	0.828
4000	2	1	2	0.817	0.870	0.934	0.852	0.853	0.806	0.349	0.866
4000	2	1	3	0.856	0.904	0.941	0.870	0.903	0.952	0.825	0.895
4000	2	1	4	0.033	0.308	0.565	0.080	0.023	0.132	0.137	0.231
4000	2	2	1	0.613	0.745	0.777	0.725	0.757	0.820	0.805	0.716
4000	2	2	2	0.674	0.770	0.806	0.776	0.775	0.702	0.537	0.752
4000	2	2	3	0.707	0.813	0.842	0.808	0.830	0.850	0.813	0.793
4000	2	2	4	0.060	0.228	0.352	0.164	0.133	0.227	0.309	0.195
4000	2	3	1	0.508	0.661	0.707	0.676	0.699	0.728	0.700	0.638
4000	2	3	2	0.547	0.660	0.695	0.684	0.694	0.604	0.498	0.643
4000	2	3	3	0.585	0.733	0.772	0.748	0.764	0.761	0.708	0.708
4000	2	3	4	0.065	0.190	0.275	0.180	0.181	0.221	0.305	0.176
4000	2	4	1	0.455	0.604	0.661	0.645	0.661	0.666	0.635	0.591
4000	2	4	2	0.482	0.581	0.619	0.619	0.631	0.533	0.460	0.573
4000	2	4	3	0.522	0.676	0.728	0.712	0.722	0.700	0.642	0.658
4000	2	4	4	0.063	0.166	0.236	0.175	0.190	0.203	0.286	0.160
4000	2	5	1	0.427	0.565	0.628	0.626	0.633	0.623	0.599	0.561
4000	2	5	2	0.450	0.528	0.567	0.575	0.583	0.485	0.437	0.528
4000	2	5	3	0.490	0.636	0.696	0.692	0.693	0.658	0.606	0.626
4000	2	5	4	0.062	0.150	0.211	0.166	0.186	0.187	0.274	0.148
4000	2	6	1	0.412	0.538	0.604	0.613	0.612	0.593	0.578	0.540
4000	2	6	2	0.431	0.493	0.530	0.545	0.548	0.453	0.423	0.498
4000	2	6	3	0.472	0.608	0.673	0.681	0.672	0.628	0.585	0.605
4000	2	6	4	0.061	0.139	0.194	0.157	0.179	0.175	0.266	0.139

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4000 2  7 1  0.402 0.520 0.586 0.603 0.595 0.572 0.565 0.526
4000 2  7 2  0.420 0.470 0.504 0.526 0.523 0.431 0.414 0.478
4000 2  7 3  0.460 0.589 0.656 0.674 0.656 0.608 0.572 0.591
4000 2  7 4  0.060 0.132 0.181 0.151 0.172 0.167 0.262 0.132
4000 2  8 1  0.396 0.507 0.572 0.596 0.582 0.558 0.557 0.515
4000 2  8 2  0.412 0.454 0.486 0.512 0.504 0.416 0.409 0.464
4000 2  8 3  0.453 0.575 0.644 0.669 0.645 0.594 0.564 0.581
4000 2  8 4  0.059 0.127 0.173 0.146 0.167 0.161 0.258 0.127
4000 2  9 1  0.391 0.498 0.561 0.590 0.572 0.547 0.551 0.508
4000 2  9 2  0.407 0.442 0.473 0.503 0.491 0.405 0.405 0.454
4000 2  9 3  0.448 0.565 0.635 0.666 0.636 0.584 0.558 0.574
4000 2  9 4  0.059 0.124 0.166 0.142 0.162 0.157 0.256 0.124
4000 2 10 1  0.388 0.491 0.553 0.586 0.565 0.540 0.547 0.502
4000 2 10 2  0.403 0.433 0.463 0.496 0.481 0.398 0.402 0.446
4000 2 10 3  0.444 0.558 0.628 0.664 0.629 0.576 0.554 0.569
4000 2 10 4  0.059 0.121 0.162 0.139 0.159 0.154 0.254 0.121
4000 2 11 1  0.375 0.459 0.514 0.562 0.527 0.504 0.528 0.474
4000 2 11 2  0.388 0.395 0.418 0.468 0.435 0.362 0.389 0.414
4000 2 11 3  0.428 0.524 0.594 0.656 0.597 0.540 0.535 0.544
4000 2 11 4  0.058 0.109 0.139 0.124 0.142 0.140 0.247 0.109
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bpk2

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** b1vr2.iua
'BKE1' 'RAPC'
1   0
**    Generic (Unclassified) PK data
          0 1  1 1  0.645 0.774 0.784 0.700 0.742 0.917 0.942 0.730
          0 1  1 2  0.895 0.911 0.907 0.880 0.880 0.934 0.944 0.898
          0 1  1 3  0.895 0.911 0.907 0.880 0.880 0.935 0.944 0.898
          0 1  1 4  0.414 0.345 0.289 0.001 0.226 0.829 0.928 0.293
          0 1  2 1  0.614 0.677 0.720 0.625 0.672 0.777 0.774 0.664
          0 1  2 2  0.749 0.785 0.812 0.764 0.770 0.810 0.780 0.778
          0 1  2 3  0.749 0.788 0.817 0.764 0.774 0.814 0.781 0.780
          0 1  2 4  0.388 0.348 0.323 0.053 0.283 0.601 0.727 0.304
          0 1  3 1  0.559 0.624 0.685 0.600 0.642 0.713 0.682 0.621
          0 1  3 2  0.666 0.728 0.768 0.732 0.722 0.747 0.688 0.721
          0 1  3 3  0.666 0.738 0.781 0.733 0.734 0.759 0.690 0.729
          0 1  3 4  0.349 0.330 0.331 0.113 0.301 0.520 0.625 0.301
          0 1  4 1  0.529 0.587 0.654 0.580 0.615 0.671 0.639 0.591
          0 1  4 2  0.626 0.693 0.734 0.715 0.685 0.707 0.645 0.688
          0 1  4 3  0.626 0.711 0.757 0.721 0.707 0.727 0.647 0.701
          0 1  4 4  0.330 0.312 0.324 0.145 0.302 0.475 0.579 0.295
          0 1  5 1  0.513 0.563 0.629 0.562 0.592 0.643 0.617 0.570
          0 1  5 2  0.605 0.671 0.711 0.704 0.660 0.682 0.623 0.668
          0 1  5 3  0.605 0.694 0.742 0.715 0.691 0.708 0.625 0.686
          0 1  5 4  0.319 0.298 0.313 0.160 0.295 0.447 0.556 0.288
          0 1  6 1  0.504 0.547 0.609 0.547 0.574 0.624 0.604 0.555
          0 1  6 2  0.593 0.657 0.696 0.697 0.644 0.666 0.610 0.655
          0 1  6 3  0.593 0.684 0.734 0.714 0.682 0.696 0.612 0.677
          0 1  6 4  0.313 0.289 0.303 0.165 0.288 0.430 0.542 0.281
          0 1  7 1  0.498 0.537 0.593 0.535 0.560 0.611 0.596 0.544
          0 1  7 2  0.585 0.647 0.687 0.693 0.634 0.655 0.602 0.647
          0 1  7 3  0.585 0.678 0.729 0.714 0.678 0.688 0.605 0.672
          0 1  7 4  0.309 0.282 0.294 0.167 0.280 0.418 0.534 0.276
          0 1  8 1  0.494 0.529 0.581 0.525 0.549 0.602 0.591 0.535
          0 1  8 2  0.580 0.641 0.681 0.691 0.628 0.648 0.597 0.642
          0 1  8 3  0.581 0.673 0.727 0.715 0.676 0.682 0.599 0.669
          0 1  8 4  0.306 0.278 0.287 0.167 0.274 0.410 0.529 0.272
          0 1  9 1  0.492 0.524 0.572 0.517 0.541 0.596 0.587 0.529
```

0	1	9	2	0.577	0.636	0.677	0.690	0.624	0.642	0.594	0.638
0	1	9	3	0.577	0.670	0.725	0.717	0.674	0.678	0.596	0.667
0	1	9	4	0.304	0.275	0.282	0.167	0.270	0.404	0.525	0.269
0	1	10	1	0.490	0.520	0.565	0.510	0.534	0.591	0.585	0.524
0	1	10	2	0.574	0.633	0.674	0.689	0.621	0.638	0.591	0.636
0	1	10	3	0.575	0.667	0.724	0.718	0.674	0.675	0.593	0.666
0	1	10	4	0.303	0.272	0.278	0.166	0.266	0.399	0.522	0.267
0	1	11	1	0.481	0.502	0.526	0.471	0.498	0.569	0.574	0.498
0	1	11	2	0.564	0.618	0.664	0.690	0.611	0.621	0.580	0.626
0	1	11	3	0.564	0.657	0.724	0.730	0.675	0.662	0.582	0.662
0	1	11	4	0.298	0.261	0.255	0.158	0.245	0.379	0.511	0.253
0	2	1	1	0.841	0.910	0.900	0.790	0.835	0.948	0.907	0.863
0	2	1	2	0.847	0.906	0.939	0.862	0.855	0.837	0.547	0.885
0	2	1	3	0.912	0.948	0.945	0.879	0.907	0.966	0.915	0.923
0	2	1	4	0.065	0.434	0.595	0.087	0.024	0.134	0.144	0.273
0	2	2	1	0.740	0.787	0.791	0.735	0.765	0.838	0.855	0.766
0	2	2	2	0.771	0.794	0.816	0.789	0.788	0.737	0.661	0.790
0	2	2	3	0.820	0.845	0.852	0.820	0.836	0.866	0.863	0.835
0	2	2	4	0.183	0.313	0.389	0.173	0.142	0.243	0.326	0.257
0	2	3	1	0.634	0.700	0.728	0.691	0.708	0.747	0.734	0.689
0	2	3	2	0.652	0.679	0.707	0.703	0.708	0.635	0.586	0.684
0	2	3	3	0.700	0.762	0.788	0.767	0.771	0.778	0.741	0.754
0	2	3	4	0.195	0.250	0.303	0.188	0.194	0.240	0.321	0.233
0	2	4	1	0.574	0.642	0.688	0.663	0.671	0.684	0.663	0.642
0	2	4	2	0.584	0.598	0.633	0.640	0.645	0.561	0.532	0.613
0	2	4	3	0.632	0.705	0.749	0.737	0.731	0.718	0.670	0.704
0	2	4	4	0.188	0.212	0.258	0.182	0.202	0.221	0.301	0.212
0	2	5	1	0.541	0.601	0.658	0.645	0.644	0.640	0.624	0.611
0	2	5	2	0.548	0.544	0.582	0.597	0.596	0.510	0.502	0.567
0	2	5	3	0.596	0.664	0.721	0.720	0.703	0.676	0.631	0.673
0	2	5	4	0.183	0.189	0.230	0.172	0.197	0.204	0.288	0.196
0	2	6	1	0.522	0.573	0.636	0.633	0.623	0.610	0.602	0.590
0	2	6	2	0.527	0.508	0.546	0.568	0.560	0.477	0.484	0.536
0	2	6	3	0.575	0.636	0.701	0.710	0.683	0.647	0.608	0.652
0	2	6	4	0.179	0.174	0.210	0.163	0.189	0.191	0.280	0.184
0	2	7	1	0.511	0.554	0.619	0.624	0.607	0.589	0.588	0.575
0	2	7	2	0.514	0.484	0.520	0.548	0.534	0.454	0.474	0.516
0	2	7	3	0.562	0.616	0.685	0.703	0.668	0.626	0.595	0.638
0	2	7	4	0.176	0.165	0.197	0.156	0.182	0.182	0.274	0.176
0	2	8	1	0.503	0.540	0.606	0.617	0.594	0.575	0.579	0.565
0	2	8	2	0.506	0.467	0.502	0.535	0.515	0.438	0.466	0.501
0	2	8	3	0.553	0.602	0.674	0.699	0.657	0.612	0.585	0.628
0	2	8	4	0.174	0.158	0.187	0.150	0.176	0.176	0.271	0.170
0	2	9	1	0.498	0.530	0.597	0.611	0.585	0.564	0.572	0.557
0	2	9	2	0.500	0.455	0.489	0.525	0.501	0.427	0.461	0.491
0	2	9	3	0.547	0.592	0.666	0.696	0.648	0.601	0.579	0.621
0	2	9	4	0.173	0.153	0.180	0.146	0.171	0.172	0.268	0.166
0	2	10	1	0.494	0.523	0.589	0.607	0.577	0.556	0.568	0.551
0	2	10	2	0.496	0.447	0.480	0.518	0.491	0.419	0.458	0.483
0	2	10	3	0.543	0.584	0.659	0.694	0.642	0.594	0.575	0.615
0	2	10	4	0.172	0.150	0.175	0.143	0.168	0.169	0.267	0.163
0	2	11	1	0.478	0.489	0.551	0.584	0.540	0.519	0.548	0.522
0	2	11	2	0.478	0.407	0.435	0.489	0.443	0.381	0.442	0.449
0	2	11	3	0.525	0.549	0.628	0.687	0.611	0.557	0.555	0.591
0	2	11	4	0.168	0.135	0.151	0.127	0.149	0.153	0.259	0.148
500	1	1	1	0.640	0.773	0.783	0.700	0.742	0.917	0.942	0.728
500	1	1	2	0.894	0.908	0.907	0.880	0.880	0.934	0.944	0.897
500	1	1	3	0.894	0.908	0.907	0.880	0.880	0.935	0.944	0.898
500	1	1	4	0.394	0.340	0.282	0.001	0.226	0.829	0.928	0.286
500	1	2	1	0.604	0.676	0.718	0.625	0.672	0.777	0.774	0.660
500	1	2	2	0.747	0.783	0.812	0.764	0.770	0.810	0.780	0.777

500	1	2	3	0.747	0.786	0.816	0.764	0.774	0.814	0.781	0.779
500	1	2	4	0.349	0.345	0.320	0.053	0.283	0.601	0.727	0.292
500	1	3	1	0.548	0.622	0.683	0.600	0.642	0.713	0.682	0.617
500	1	3	2	0.664	0.725	0.767	0.732	0.722	0.747	0.688	0.720
500	1	3	3	0.664	0.736	0.780	0.733	0.734	0.759	0.690	0.727
500	1	3	4	0.310	0.328	0.328	0.113	0.301	0.520	0.625	0.289
500	1	4	1	0.519	0.585	0.651	0.580	0.615	0.671	0.639	0.587
500	1	4	2	0.624	0.690	0.733	0.715	0.685	0.707	0.645	0.687
500	1	4	3	0.624	0.708	0.755	0.721	0.707	0.726	0.647	0.699
500	1	4	4	0.291	0.310	0.322	0.145	0.302	0.475	0.579	0.283
500	1	5	1	0.503	0.561	0.625	0.562	0.592	0.642	0.617	0.566
500	1	5	2	0.603	0.668	0.710	0.704	0.660	0.682	0.623	0.666
500	1	5	3	0.603	0.691	0.740	0.715	0.691	0.707	0.625	0.684
500	1	5	4	0.281	0.297	0.311	0.160	0.295	0.447	0.556	0.276
500	1	6	1	0.494	0.545	0.605	0.547	0.574	0.624	0.604	0.551
500	1	6	2	0.591	0.654	0.695	0.697	0.644	0.666	0.610	0.654
500	1	6	3	0.591	0.681	0.732	0.714	0.682	0.695	0.612	0.675
500	1	6	4	0.275	0.288	0.301	0.165	0.288	0.430	0.542	0.270
500	1	7	1	0.488	0.534	0.589	0.535	0.560	0.611	0.596	0.539
500	1	7	2	0.584	0.644	0.685	0.693	0.634	0.655	0.602	0.646
500	1	7	3	0.584	0.674	0.727	0.714	0.677	0.687	0.604	0.670
500	1	7	4	0.271	0.281	0.293	0.167	0.280	0.418	0.534	0.265
500	1	8	1	0.484	0.527	0.577	0.525	0.549	0.602	0.591	0.531
500	1	8	2	0.579	0.638	0.679	0.691	0.628	0.648	0.597	0.640
500	1	8	3	0.579	0.670	0.724	0.715	0.675	0.682	0.599	0.667
500	1	8	4	0.269	0.277	0.286	0.167	0.274	0.410	0.529	0.261
500	1	9	1	0.482	0.521	0.568	0.516	0.540	0.595	0.587	0.525
500	1	9	2	0.575	0.634	0.675	0.690	0.624	0.642	0.594	0.637
500	1	9	3	0.576	0.667	0.723	0.717	0.674	0.678	0.596	0.665
500	1	9	4	0.267	0.273	0.281	0.167	0.270	0.404	0.525	0.258
500	1	10	1	0.480	0.517	0.561	0.510	0.533	0.591	0.585	0.520
500	1	10	2	0.573	0.630	0.672	0.689	0.621	0.638	0.591	0.634
500	1	10	3	0.573	0.664	0.722	0.718	0.673	0.675	0.593	0.664
500	1	10	4	0.266	0.271	0.276	0.166	0.266	0.399	0.522	0.256
500	1	11	1	0.472	0.499	0.522	0.471	0.498	0.568	0.574	0.494
500	1	11	2	0.562	0.615	0.662	0.690	0.611	0.621	0.580	0.625
500	1	11	3	0.562	0.653	0.721	0.730	0.674	0.662	0.582	0.660
500	1	11	4	0.261	0.260	0.254	0.158	0.245	0.379	0.511	0.243
500	2	1	1	0.836	0.906	0.899	0.790	0.834	0.947	0.898	0.860
500	2	1	2	0.846	0.904	0.938	0.862	0.854	0.836	0.526	0.884
500	2	1	3	0.908	0.944	0.944	0.879	0.906	0.965	0.907	0.921
500	2	1	4	0.061	0.429	0.591	0.087	0.024	0.134	0.144	0.270
500	2	2	1	0.731	0.784	0.788	0.735	0.764	0.837	0.851	0.762
500	2	2	2	0.769	0.792	0.814	0.787	0.787	0.734	0.650	0.789
500	2	2	3	0.816	0.843	0.850	0.819	0.836	0.864	0.859	0.833
500	2	2	4	0.162	0.307	0.384	0.171	0.142	0.242	0.325	0.248
500	2	3	1	0.626	0.697	0.724	0.690	0.707	0.745	0.731	0.685
500	2	3	2	0.650	0.678	0.704	0.701	0.707	0.633	0.579	0.682
500	2	3	3	0.697	0.760	0.786	0.766	0.771	0.777	0.739	0.752
500	2	3	4	0.172	0.246	0.300	0.186	0.193	0.239	0.320	0.225
500	2	4	1	0.566	0.639	0.684	0.662	0.670	0.683	0.660	0.638
500	2	4	2	0.582	0.597	0.631	0.638	0.644	0.559	0.527	0.611
500	2	4	3	0.629	0.702	0.746	0.736	0.730	0.717	0.667	0.702
500	2	4	4	0.166	0.210	0.256	0.180	0.202	0.220	0.300	0.204
500	2	5	1	0.534	0.598	0.655	0.644	0.643	0.639	0.622	0.607
500	2	5	2	0.546	0.542	0.580	0.596	0.595	0.509	0.497	0.565
500	2	5	3	0.593	0.661	0.718	0.718	0.702	0.674	0.629	0.670
500	2	5	4	0.161	0.187	0.228	0.170	0.196	0.203	0.287	0.188
500	2	6	1	0.515	0.570	0.632	0.631	0.622	0.609	0.600	0.586
500	2	6	2	0.525	0.507	0.544	0.566	0.559	0.475	0.480	0.535
500	2	6	3	0.572	0.633	0.697	0.708	0.682	0.645	0.607	0.650

500	2	6	4	0.157	0.172	0.208	0.161	0.188	0.191	0.279	0.177
500	2	7	1	0.504	0.551	0.615	0.622	0.605	0.588	0.586	0.572
500	2	7	2	0.513	0.483	0.519	0.547	0.533	0.453	0.469	0.514
500	2	7	3	0.559	0.613	0.682	0.702	0.667	0.625	0.593	0.635
500	2	7	4	0.155	0.163	0.195	0.154	0.181	0.182	0.274	0.169
500	2	8	1	0.496	0.537	0.603	0.615	0.593	0.573	0.577	0.561
500	2	8	2	0.504	0.466	0.501	0.533	0.515	0.437	0.462	0.500
500	2	8	3	0.551	0.600	0.671	0.698	0.656	0.611	0.584	0.626
500	2	8	4	0.153	0.156	0.186	0.149	0.175	0.176	0.271	0.164
500	2	9	1	0.491	0.528	0.593	0.610	0.583	0.563	0.571	0.553
500	2	9	2	0.499	0.454	0.488	0.523	0.501	0.426	0.457	0.490
500	2	9	3	0.545	0.589	0.662	0.695	0.647	0.600	0.577	0.618
500	2	9	4	0.152	0.152	0.179	0.145	0.171	0.171	0.268	0.160
500	2	10	1	0.487	0.520	0.585	0.605	0.576	0.555	0.566	0.547
500	2	10	2	0.494	0.446	0.478	0.516	0.490	0.418	0.454	0.482
500	2	10	3	0.541	0.582	0.656	0.693	0.641	0.592	0.573	0.613
500	2	10	4	0.152	0.148	0.174	0.142	0.167	0.168	0.266	0.156
500	2	11	1	0.471	0.487	0.547	0.582	0.539	0.518	0.547	0.519
500	2	11	2	0.476	0.406	0.434	0.487	0.443	0.380	0.438	0.448
500	2	11	3	0.522	0.547	0.624	0.685	0.610	0.556	0.553	0.588
500	2	11	4	0.148	0.133	0.150	0.126	0.149	0.153	0.259	0.142
1000	1	1	1	0.631	0.771	0.783	0.700	0.742	0.917	0.942	0.725
1000	1	1	2	0.891	0.908	0.907	0.880	0.880	0.934	0.944	0.897
1000	1	1	3	0.891	0.908	0.907	0.880	0.880	0.935	0.944	0.897
1000	1	1	4	0.356	0.332	0.282	0.001	0.226	0.829	0.928	0.274
1000	1	2	1	0.590	0.674	0.718	0.624	0.672	0.777	0.774	0.656
1000	1	2	2	0.743	0.783	0.812	0.762	0.770	0.810	0.780	0.775
1000	1	2	3	0.743	0.785	0.816	0.763	0.774	0.814	0.781	0.777
1000	1	2	4	0.295	0.339	0.320	0.053	0.283	0.601	0.727	0.276
1000	1	3	1	0.535	0.619	0.682	0.597	0.642	0.713	0.682	0.612
1000	1	3	2	0.660	0.723	0.767	0.727	0.722	0.747	0.688	0.718
1000	1	3	3	0.661	0.733	0.780	0.729	0.734	0.758	0.690	0.725
1000	1	3	4	0.256	0.324	0.328	0.113	0.301	0.520	0.625	0.274
1000	1	4	1	0.506	0.581	0.651	0.577	0.615	0.671	0.639	0.582
1000	1	4	2	0.621	0.687	0.733	0.709	0.685	0.707	0.645	0.684
1000	1	4	3	0.621	0.704	0.755	0.714	0.707	0.726	0.647	0.697
1000	1	4	4	0.238	0.307	0.322	0.145	0.302	0.475	0.579	0.268
1000	1	5	1	0.490	0.556	0.625	0.559	0.592	0.642	0.617	0.561
1000	1	5	2	0.600	0.664	0.710	0.697	0.660	0.682	0.623	0.664
1000	1	5	3	0.600	0.687	0.740	0.708	0.690	0.707	0.625	0.681
1000	1	5	4	0.229	0.294	0.311	0.160	0.295	0.447	0.556	0.262
1000	1	6	1	0.481	0.540	0.604	0.544	0.573	0.623	0.604	0.546
1000	1	6	2	0.588	0.650	0.695	0.690	0.644	0.666	0.610	0.651
1000	1	6	3	0.588	0.677	0.731	0.706	0.682	0.695	0.612	0.672
1000	1	6	4	0.224	0.285	0.301	0.165	0.288	0.430	0.542	0.256
1000	1	7	1	0.476	0.530	0.589	0.531	0.559	0.610	0.596	0.534
1000	1	7	2	0.581	0.641	0.685	0.686	0.634	0.655	0.602	0.643
1000	1	7	3	0.581	0.670	0.727	0.707	0.677	0.687	0.604	0.667
1000	1	7	4	0.221	0.278	0.293	0.167	0.280	0.418	0.534	0.251
1000	1	8	1	0.472	0.522	0.577	0.521	0.548	0.601	0.591	0.526
1000	1	8	2	0.576	0.634	0.679	0.684	0.628	0.648	0.597	0.638
1000	1	8	3	0.576	0.665	0.724	0.708	0.674	0.681	0.599	0.664
1000	1	8	4	0.218	0.274	0.286	0.167	0.274	0.410	0.529	0.247
1000	1	9	1	0.469	0.517	0.567	0.513	0.539	0.595	0.587	0.519
1000	1	9	2	0.572	0.629	0.675	0.683	0.624	0.642	0.594	0.634
1000	1	9	3	0.572	0.662	0.722	0.709	0.673	0.677	0.596	0.662
1000	1	9	4	0.217	0.271	0.281	0.167	0.270	0.404	0.525	0.244
1000	1	10	1	0.467	0.513	0.560	0.506	0.533	0.590	0.585	0.515
1000	1	10	2	0.570	0.626	0.672	0.682	0.621	0.638	0.591	0.632
1000	1	10	3	0.570	0.659	0.721	0.711	0.672	0.674	0.593	0.661
1000	1	10	4	0.216	0.268	0.276	0.166	0.266	0.399	0.522	0.242

1000	1	11	1	0.459	0.495	0.521	0.467	0.497	0.568	0.573	0.489
1000	1	11	2	0.559	0.611	0.662	0.684	0.611	0.621	0.580	0.622
1000	1	11	3	0.559	0.648	0.720	0.723	0.673	0.661	0.582	0.657
1000	1	11	4	0.211	0.257	0.254	0.158	0.245	0.379	0.511	0.229
1000	2	1	1	0.830	0.899	0.899	0.790	0.833	0.945	0.890	0.857
1000	2	1	2	0.845	0.901	0.938	0.862	0.854	0.831	0.509	0.883
1000	2	1	3	0.904	0.940	0.944	0.879	0.906	0.964	0.899	0.919
1000	2	1	4	0.057	0.410	0.591	0.087	0.024	0.134	0.144	0.265
1000	2	2	1	0.721	0.779	0.788	0.734	0.763	0.835	0.846	0.758
1000	2	2	2	0.766	0.790	0.814	0.786	0.787	0.730	0.638	0.787
1000	2	2	3	0.811	0.840	0.849	0.818	0.836	0.863	0.855	0.831
1000	2	2	4	0.137	0.297	0.384	0.171	0.142	0.240	0.325	0.239
1000	2	3	1	0.617	0.693	0.724	0.689	0.706	0.743	0.728	0.681
1000	2	3	2	0.647	0.676	0.704	0.699	0.707	0.630	0.570	0.681
1000	2	3	3	0.693	0.757	0.785	0.764	0.771	0.775	0.736	0.749
1000	2	3	4	0.144	0.239	0.299	0.185	0.193	0.237	0.320	0.215
1000	2	4	1	0.557	0.635	0.683	0.660	0.670	0.681	0.658	0.634
1000	2	4	2	0.580	0.595	0.631	0.636	0.644	0.557	0.519	0.610
1000	2	4	3	0.626	0.699	0.745	0.733	0.730	0.715	0.665	0.699
1000	2	4	4	0.138	0.204	0.255	0.179	0.202	0.218	0.300	0.195
1000	2	5	1	0.525	0.594	0.654	0.641	0.642	0.637	0.620	0.603
1000	2	5	2	0.544	0.540	0.580	0.593	0.595	0.506	0.490	0.564
1000	2	5	3	0.590	0.658	0.717	0.715	0.702	0.673	0.627	0.668
1000	2	5	4	0.134	0.183	0.227	0.169	0.196	0.201	0.287	0.180
1000	2	6	1	0.507	0.566	0.631	0.629	0.621	0.607	0.598	0.582
1000	2	6	2	0.523	0.505	0.544	0.564	0.559	0.473	0.473	0.533
1000	2	6	3	0.569	0.630	0.696	0.705	0.681	0.644	0.605	0.647
1000	2	6	4	0.131	0.169	0.208	0.161	0.188	0.188	0.279	0.169
1000	2	7	1	0.496	0.547	0.614	0.620	0.604	0.586	0.584	0.568
1000	2	7	2	0.511	0.481	0.519	0.544	0.533	0.451	0.463	0.513
1000	2	7	3	0.556	0.610	0.681	0.698	0.666	0.623	0.591	0.633
1000	2	7	4	0.129	0.159	0.195	0.154	0.181	0.180	0.274	0.161
1000	2	8	1	0.488	0.534	0.601	0.613	0.592	0.571	0.575	0.557
1000	2	8	2	0.502	0.464	0.501	0.530	0.514	0.435	0.456	0.498
1000	2	8	3	0.548	0.596	0.669	0.694	0.655	0.609	0.582	0.623
1000	2	8	4	0.128	0.153	0.185	0.148	0.175	0.174	0.270	0.156
1000	2	9	1	0.483	0.524	0.591	0.607	0.582	0.561	0.569	0.549
1000	2	9	2	0.496	0.452	0.488	0.521	0.501	0.424	0.451	0.488
1000	2	9	3	0.542	0.586	0.661	0.691	0.646	0.598	0.576	0.616
1000	2	9	4	0.127	0.149	0.178	0.144	0.171	0.169	0.268	0.152
1000	2	10	1	0.479	0.517	0.584	0.603	0.575	0.553	0.564	0.543
1000	2	10	2	0.492	0.444	0.478	0.514	0.490	0.416	0.447	0.481
1000	2	10	3	0.538	0.579	0.654	0.689	0.640	0.591	0.571	0.610
1000	2	10	4	0.126	0.145	0.173	0.141	0.167	0.166	0.266	0.149
1000	2	11	1	0.463	0.483	0.545	0.579	0.537	0.516	0.545	0.515
1000	2	11	2	0.474	0.405	0.434	0.485	0.443	0.379	0.432	0.447
1000	2	11	3	0.520	0.544	0.623	0.681	0.608	0.554	0.552	0.586
1000	2	11	4	0.123	0.131	0.149	0.126	0.149	0.151	0.258	0.134
1500	1	1	1	0.621	0.763	0.779	0.700	0.742	0.917	0.942	0.719
1500	1	1	2	0.884	0.906	0.907	0.880	0.880	0.934	0.944	0.894
1500	1	1	3	0.884	0.906	0.907	0.880	0.880	0.935	0.944	0.894
1500	1	1	4	0.334	0.313	0.266	0.001	0.226	0.829	0.928	0.260
1500	1	2	1	0.577	0.663	0.716	0.624	0.672	0.776	0.774	0.650
1500	1	2	2	0.734	0.778	0.812	0.762	0.770	0.810	0.780	0.772
1500	1	2	3	0.734	0.781	0.816	0.763	0.774	0.814	0.781	0.774
1500	1	2	4	0.259	0.325	0.313	0.053	0.283	0.601	0.727	0.261
1500	1	3	1	0.522	0.609	0.680	0.597	0.642	0.713	0.682	0.606
1500	1	3	2	0.653	0.719	0.767	0.727	0.722	0.747	0.688	0.715
1500	1	3	3	0.653	0.729	0.779	0.729	0.734	0.758	0.690	0.722
1500	1	3	4	0.218	0.314	0.324	0.113	0.301	0.520	0.625	0.260
1500	1	4	1	0.493	0.571	0.648	0.577	0.614	0.670	0.639	0.576

1500	1	4	2	0.613	0.683	0.733	0.709	0.685	0.707	0.645	0.682
1500	1	4	3	0.614	0.701	0.755	0.714	0.706	0.726	0.647	0.694
1500	1	4	4	0.200	0.298	0.318	0.145	0.302	0.475	0.579	0.255
1500	1	5	1	0.478	0.547	0.622	0.558	0.591	0.642	0.617	0.555
1500	1	5	2	0.593	0.661	0.710	0.697	0.659	0.682	0.623	0.661
1500	1	5	3	0.593	0.684	0.740	0.708	0.689	0.707	0.625	0.678
1500	1	5	4	0.191	0.286	0.308	0.160	0.295	0.447	0.556	0.249
1500	1	6	1	0.469	0.531	0.602	0.543	0.573	0.623	0.604	0.540
1500	1	6	2	0.581	0.647	0.695	0.690	0.643	0.666	0.610	0.648
1500	1	6	3	0.581	0.673	0.731	0.706	0.680	0.694	0.612	0.669
1500	1	6	4	0.186	0.277	0.298	0.165	0.288	0.430	0.542	0.243
1500	1	7	1	0.463	0.521	0.586	0.531	0.559	0.610	0.596	0.528
1500	1	7	2	0.574	0.637	0.685	0.686	0.633	0.655	0.602	0.640
1500	1	7	3	0.574	0.666	0.726	0.706	0.675	0.686	0.604	0.664
1500	1	7	4	0.183	0.271	0.290	0.167	0.280	0.418	0.534	0.239
1500	1	8	1	0.460	0.513	0.574	0.521	0.547	0.601	0.591	0.520
1500	1	8	2	0.569	0.631	0.679	0.684	0.626	0.648	0.597	0.635
1500	1	8	3	0.569	0.662	0.723	0.708	0.672	0.681	0.599	0.661
1500	1	8	4	0.181	0.267	0.284	0.167	0.274	0.410	0.529	0.235
1500	1	9	1	0.457	0.508	0.564	0.512	0.539	0.594	0.587	0.514
1500	1	9	2	0.566	0.626	0.675	0.683	0.622	0.642	0.594	0.631
1500	1	9	3	0.566	0.658	0.722	0.709	0.671	0.677	0.596	0.659
1500	1	9	4	0.180	0.264	0.278	0.167	0.270	0.404	0.525	0.232
1500	1	10	1	0.455	0.504	0.557	0.505	0.532	0.590	0.585	0.509
1500	1	10	2	0.563	0.623	0.672	0.682	0.619	0.638	0.591	0.629
1500	1	10	3	0.563	0.656	0.721	0.711	0.670	0.674	0.593	0.658
1500	1	10	4	0.179	0.262	0.274	0.166	0.266	0.399	0.522	0.230
1500	1	11	1	0.447	0.486	0.518	0.467	0.496	0.567	0.573	0.483
1500	1	11	2	0.553	0.608	0.662	0.684	0.609	0.621	0.580	0.620
1500	1	11	3	0.553	0.645	0.719	0.722	0.670	0.661	0.582	0.654
1500	1	11	4	0.174	0.251	0.252	0.158	0.245	0.379	0.511	0.217
1500	2	1	1	0.819	0.883	0.897	0.790	0.833	0.941	0.884	0.851
1500	2	1	2	0.840	0.887	0.937	0.862	0.854	0.822	0.503	0.878
1500	2	1	3	0.897	0.925	0.944	0.879	0.906	0.961	0.893	0.914
1500	2	1	4	0.049	0.395	0.583	0.087	0.024	0.134	0.144	0.258
1500	2	2	1	0.710	0.769	0.785	0.734	0.763	0.832	0.843	0.752
1500	2	2	2	0.761	0.783	0.812	0.786	0.786	0.724	0.632	0.783
1500	2	2	3	0.803	0.832	0.848	0.818	0.835	0.861	0.851	0.827
1500	2	2	4	0.115	0.285	0.372	0.171	0.140	0.239	0.324	0.228
1500	2	3	1	0.606	0.685	0.720	0.688	0.706	0.741	0.726	0.676
1500	2	3	2	0.642	0.671	0.703	0.698	0.706	0.625	0.564	0.678
1500	2	3	3	0.687	0.751	0.783	0.764	0.770	0.773	0.734	0.746
1500	2	3	4	0.120	0.231	0.291	0.185	0.192	0.235	0.319	0.205
1500	2	4	1	0.548	0.627	0.680	0.659	0.669	0.679	0.656	0.629
1500	2	4	2	0.575	0.591	0.629	0.636	0.643	0.553	0.514	0.607
1500	2	4	3	0.621	0.694	0.743	0.732	0.729	0.713	0.663	0.696
1500	2	4	4	0.116	0.198	0.248	0.179	0.200	0.216	0.300	0.186
1500	2	5	1	0.517	0.588	0.650	0.641	0.641	0.635	0.618	0.598
1500	2	5	2	0.540	0.538	0.578	0.593	0.594	0.503	0.486	0.562
1500	2	5	3	0.585	0.654	0.714	0.714	0.700	0.671	0.625	0.665
1500	2	5	4	0.112	0.177	0.221	0.169	0.195	0.199	0.287	0.171
1500	2	6	1	0.499	0.560	0.627	0.628	0.620	0.605	0.596	0.578
1500	2	6	2	0.520	0.502	0.542	0.564	0.558	0.470	0.469	0.531
1500	2	6	3	0.564	0.626	0.693	0.704	0.680	0.642	0.603	0.644
1500	2	6	4	0.110	0.163	0.203	0.160	0.187	0.187	0.279	0.161
1500	2	7	1	0.488	0.541	0.610	0.619	0.603	0.584	0.582	0.563
1500	2	7	2	0.507	0.479	0.517	0.544	0.532	0.448	0.459	0.511
1500	2	7	3	0.552	0.606	0.677	0.697	0.664	0.621	0.589	0.630
1500	2	7	4	0.108	0.155	0.190	0.154	0.180	0.178	0.273	0.153
1500	2	8	1	0.480	0.528	0.597	0.611	0.591	0.569	0.573	0.552
1500	2	8	2	0.499	0.462	0.499	0.530	0.513	0.432	0.452	0.496

1500	2	8	3	0.543	0.593	0.666	0.693	0.653	0.607	0.580	0.620
1500	2	8	4	0.107	0.149	0.181	0.148	0.174	0.172	0.270	0.148
1500	2	9	1	0.475	0.518	0.587	0.606	0.581	0.559	0.567	0.545
1500	2	9	2	0.493	0.450	0.486	0.521	0.499	0.421	0.447	0.486
1500	2	9	3	0.538	0.583	0.657	0.690	0.644	0.597	0.574	0.612
1500	2	9	4	0.106	0.144	0.174	0.144	0.170	0.168	0.267	0.144
1500	2	10	1	0.472	0.511	0.579	0.602	0.574	0.551	0.563	0.539
1500	2	10	2	0.489	0.442	0.477	0.514	0.489	0.413	0.444	0.479
1500	2	10	3	0.533	0.575	0.651	0.688	0.638	0.589	0.570	0.607
1500	2	10	4	0.106	0.141	0.169	0.141	0.166	0.164	0.266	0.141
1500	2	11	1	0.456	0.478	0.540	0.578	0.536	0.514	0.543	0.510
1500	2	11	2	0.471	0.403	0.432	0.485	0.442	0.376	0.428	0.445
1500	2	11	3	0.515	0.541	0.618	0.680	0.606	0.553	0.550	0.582
1500	2	11	4	0.103	0.127	0.146	0.126	0.148	0.150	0.258	0.127
2000	1	1	1	0.613	0.760	0.779	0.700	0.742	0.917	0.942	0.717
2000	1	1	2	0.882	0.891	0.907	0.879	0.880	0.934	0.944	0.891
2000	1	1	3	0.882	0.891	0.907	0.879	0.880	0.935	0.944	0.891
2000	1	1	4	0.303	0.310	0.266	0.001	0.226	0.829	0.928	0.251
2000	1	2	1	0.567	0.656	0.716	0.621	0.672	0.776	0.774	0.645
2000	1	2	2	0.732	0.772	0.812	0.759	0.770	0.810	0.780	0.770
2000	1	2	3	0.732	0.774	0.816	0.759	0.774	0.813	0.781	0.772
2000	1	2	4	0.222	0.323	0.313	0.053	0.283	0.601	0.727	0.251
2000	1	3	1	0.512	0.601	0.679	0.592	0.642	0.713	0.682	0.601
2000	1	3	2	0.651	0.715	0.767	0.719	0.722	0.746	0.688	0.712
2000	1	3	3	0.651	0.725	0.779	0.721	0.733	0.757	0.690	0.719
2000	1	3	4	0.181	0.311	0.324	0.113	0.301	0.520	0.625	0.250
2000	1	4	1	0.484	0.564	0.646	0.570	0.614	0.670	0.639	0.570
2000	1	4	2	0.612	0.680	0.733	0.699	0.685	0.706	0.645	0.679
2000	1	4	3	0.612	0.697	0.754	0.704	0.706	0.725	0.647	0.691
2000	1	4	4	0.164	0.296	0.318	0.145	0.302	0.475	0.579	0.245
2000	1	5	1	0.469	0.540	0.620	0.551	0.591	0.641	0.617	0.549
2000	1	5	2	0.591	0.658	0.710	0.686	0.659	0.681	0.623	0.658
2000	1	5	3	0.591	0.680	0.739	0.697	0.689	0.705	0.625	0.675
2000	1	5	4	0.155	0.284	0.308	0.160	0.295	0.447	0.556	0.239
2000	1	6	1	0.460	0.524	0.600	0.536	0.572	0.622	0.604	0.534
2000	1	6	2	0.580	0.644	0.695	0.679	0.643	0.665	0.610	0.645
2000	1	6	3	0.580	0.670	0.730	0.695	0.679	0.693	0.612	0.666
2000	1	6	4	0.150	0.276	0.298	0.165	0.288	0.430	0.542	0.233
2000	1	7	1	0.454	0.514	0.584	0.523	0.558	0.610	0.596	0.523
2000	1	7	2	0.572	0.635	0.685	0.675	0.633	0.654	0.602	0.637
2000	1	7	3	0.572	0.663	0.725	0.695	0.674	0.685	0.604	0.661
2000	1	7	4	0.147	0.270	0.290	0.167	0.280	0.418	0.534	0.229
2000	1	8	1	0.451	0.507	0.572	0.513	0.547	0.601	0.591	0.514
2000	1	8	2	0.568	0.629	0.679	0.673	0.626	0.647	0.597	0.632
2000	1	8	3	0.568	0.659	0.722	0.696	0.672	0.680	0.599	0.658
2000	1	8	4	0.145	0.266	0.284	0.167	0.274	0.410	0.529	0.225
2000	1	9	1	0.448	0.501	0.562	0.505	0.538	0.594	0.587	0.508
2000	1	9	2	0.564	0.624	0.675	0.672	0.622	0.642	0.594	0.629
2000	1	9	3	0.564	0.655	0.721	0.698	0.670	0.676	0.596	0.656
2000	1	9	4	0.144	0.263	0.278	0.167	0.270	0.404	0.525	0.222
2000	1	10	1	0.446	0.498	0.555	0.498	0.531	0.589	0.585	0.503
2000	1	10	2	0.562	0.621	0.672	0.671	0.619	0.638	0.591	0.626
2000	1	10	3	0.562	0.653	0.720	0.699	0.669	0.673	0.593	0.654
2000	1	10	4	0.143	0.261	0.274	0.166	0.266	0.399	0.522	0.220
2000	1	11	1	0.438	0.480	0.516	0.460	0.495	0.567	0.573	0.478
2000	1	11	2	0.551	0.606	0.662	0.674	0.609	0.620	0.580	0.617
2000	1	11	3	0.551	0.642	0.719	0.712	0.670	0.659	0.582	0.651
2000	1	11	4	0.139	0.250	0.252	0.158	0.245	0.379	0.511	0.207
2000	2	1	1	0.813	0.878	0.897	0.783	0.832	0.940	0.878	0.847
2000	2	1	2	0.840	0.885	0.937	0.855	0.854	0.822	0.498	0.877
2000	2	1	3	0.893	0.920	0.944	0.872	0.905	0.960	0.887	0.910

2000	2	1	4	0.046	0.391	0.583	0.086	0.023	0.133	0.143	0.257
2000	2	2	1	0.700	0.764	0.785	0.730	0.762	0.831	0.839	0.747
2000	2	2	2	0.758	0.780	0.812	0.781	0.785	0.723	0.627	0.781
2000	2	2	3	0.799	0.827	0.848	0.813	0.834	0.860	0.848	0.824
2000	2	2	4	0.094	0.280	0.372	0.169	0.140	0.236	0.322	0.221
2000	2	3	1	0.597	0.679	0.719	0.684	0.705	0.740	0.723	0.671
2000	2	3	2	0.639	0.669	0.703	0.693	0.705	0.624	0.561	0.675
2000	2	3	3	0.683	0.747	0.782	0.758	0.769	0.772	0.731	0.743
2000	2	3	4	0.097	0.227	0.291	0.184	0.191	0.233	0.317	0.197
2000	2	4	1	0.539	0.621	0.678	0.654	0.668	0.677	0.654	0.624
2000	2	4	2	0.573	0.589	0.629	0.630	0.642	0.551	0.512	0.605
2000	2	4	3	0.617	0.690	0.742	0.726	0.728	0.711	0.661	0.693
2000	2	4	4	0.093	0.195	0.248	0.178	0.199	0.214	0.298	0.179
2000	2	5	1	0.509	0.582	0.648	0.636	0.640	0.633	0.616	0.594
2000	2	5	2	0.537	0.536	0.578	0.587	0.593	0.502	0.483	0.559
2000	2	5	3	0.581	0.650	0.713	0.708	0.699	0.669	0.623	0.661
2000	2	5	4	0.090	0.174	0.221	0.168	0.194	0.197	0.285	0.164
2000	2	6	1	0.491	0.554	0.625	0.623	0.618	0.603	0.594	0.573
2000	2	6	2	0.517	0.501	0.542	0.558	0.557	0.469	0.467	0.529
2000	2	6	3	0.561	0.622	0.692	0.698	0.678	0.640	0.602	0.641
2000	2	6	4	0.089	0.161	0.203	0.160	0.186	0.185	0.277	0.154
2000	2	7	1	0.480	0.536	0.608	0.614	0.602	0.582	0.581	0.558
2000	2	7	2	0.504	0.477	0.517	0.539	0.531	0.447	0.457	0.509
2000	2	7	3	0.548	0.603	0.676	0.691	0.663	0.620	0.588	0.626
2000	2	7	4	0.087	0.153	0.190	0.153	0.179	0.176	0.272	0.147
2000	2	8	1	0.473	0.522	0.595	0.607	0.589	0.568	0.572	0.548
2000	2	8	2	0.496	0.460	0.499	0.525	0.512	0.431	0.450	0.494
2000	2	8	3	0.540	0.589	0.664	0.687	0.652	0.605	0.579	0.616
2000	2	8	4	0.086	0.147	0.181	0.148	0.173	0.170	0.268	0.142
2000	2	9	1	0.468	0.513	0.585	0.601	0.580	0.557	0.566	0.540
2000	2	9	2	0.490	0.449	0.486	0.516	0.499	0.420	0.445	0.484
2000	2	9	3	0.534	0.579	0.656	0.684	0.643	0.595	0.573	0.609
2000	2	9	4	0.086	0.142	0.174	0.144	0.169	0.166	0.266	0.138
2000	2	10	1	0.464	0.506	0.577	0.597	0.572	0.549	0.561	0.534
2000	2	10	2	0.486	0.440	0.477	0.509	0.488	0.412	0.441	0.477
2000	2	10	3	0.530	0.571	0.649	0.682	0.636	0.587	0.568	0.604
2000	2	10	4	0.085	0.139	0.169	0.140	0.165	0.163	0.264	0.135
2000	2	11	1	0.448	0.473	0.538	0.573	0.535	0.513	0.542	0.506
2000	2	11	2	0.468	0.401	0.432	0.480	0.441	0.375	0.427	0.443
2000	2	11	3	0.512	0.537	0.617	0.674	0.605	0.551	0.549	0.579
2000	2	11	4	0.083	0.125	0.146	0.125	0.147	0.148	0.256	0.121
2500	1	1	1	0.607	0.752	0.776	0.700	0.742	0.917	0.942	0.713
2500	1	1	2	0.873	0.883	0.907	0.879	0.880	0.934	0.944	0.887
2500	1	1	3	0.873	0.883	0.907	0.879	0.880	0.935	0.944	0.887
2500	1	1	4	0.292	0.287	0.257	0.001	0.226	0.829	0.928	0.241
2500	1	2	1	0.561	0.650	0.713	0.621	0.672	0.776	0.774	0.642
2500	1	2	2	0.717	0.769	0.812	0.758	0.770	0.810	0.780	0.765
2500	1	2	3	0.717	0.771	0.816	0.758	0.774	0.813	0.781	0.767
2500	1	2	4	0.213	0.306	0.310	0.053	0.283	0.601	0.727	0.244
2500	1	3	1	0.507	0.596	0.674	0.592	0.641	0.713	0.682	0.597
2500	1	3	2	0.635	0.713	0.766	0.717	0.722	0.746	0.688	0.707
2500	1	3	3	0.636	0.723	0.778	0.718	0.733	0.757	0.690	0.714
2500	1	3	4	0.173	0.299	0.321	0.113	0.301	0.520	0.625	0.244
2500	1	4	1	0.479	0.560	0.640	0.570	0.614	0.670	0.639	0.567
2500	1	4	2	0.597	0.678	0.732	0.695	0.685	0.705	0.645	0.673
2500	1	4	3	0.597	0.695	0.753	0.700	0.705	0.724	0.647	0.685
2500	1	4	4	0.156	0.286	0.316	0.145	0.302	0.475	0.579	0.240
2500	1	5	1	0.464	0.536	0.613	0.551	0.590	0.641	0.617	0.545
2500	1	5	2	0.577	0.656	0.708	0.682	0.659	0.680	0.623	0.653
2500	1	5	3	0.577	0.678	0.737	0.693	0.688	0.704	0.625	0.669
2500	1	5	4	0.148	0.275	0.307	0.160	0.295	0.447	0.556	0.235

2500	1	6	1	0.455	0.521	0.592	0.536	0.572	0.622	0.604	0.530
2500	1	6	2	0.565	0.643	0.693	0.675	0.643	0.663	0.610	0.640
2500	1	6	3	0.565	0.668	0.728	0.690	0.679	0.691	0.612	0.660
2500	1	6	4	0.143	0.267	0.297	0.165	0.288	0.430	0.542	0.229
2500	1	7	1	0.450	0.510	0.577	0.523	0.557	0.609	0.596	0.519
2500	1	7	2	0.558	0.634	0.683	0.671	0.633	0.652	0.602	0.632
2500	1	7	3	0.558	0.661	0.723	0.690	0.674	0.683	0.604	0.655
2500	1	7	4	0.140	0.262	0.289	0.167	0.280	0.418	0.534	0.225
2500	1	8	1	0.446	0.503	0.564	0.513	0.546	0.600	0.591	0.510
2500	1	8	2	0.553	0.627	0.677	0.668	0.626	0.645	0.597	0.627
2500	1	8	3	0.553	0.657	0.720	0.691	0.671	0.677	0.599	0.652
2500	1	8	4	0.138	0.258	0.282	0.167	0.274	0.410	0.529	0.221
2500	1	9	1	0.443	0.498	0.555	0.505	0.538	0.594	0.587	0.504
2500	1	9	2	0.550	0.623	0.673	0.667	0.622	0.639	0.594	0.623
2500	1	9	3	0.550	0.654	0.718	0.693	0.669	0.673	0.596	0.650
2500	1	9	4	0.137	0.255	0.277	0.167	0.270	0.404	0.525	0.218
2500	1	10	1	0.442	0.494	0.548	0.498	0.531	0.589	0.585	0.499
2500	1	10	2	0.548	0.620	0.670	0.667	0.619	0.635	0.591	0.621
2500	1	10	3	0.548	0.651	0.717	0.694	0.669	0.670	0.593	0.649
2500	1	10	4	0.136	0.253	0.273	0.166	0.266	0.399	0.522	0.216
2500	1	11	1	0.434	0.477	0.509	0.459	0.494	0.566	0.573	0.474
2500	1	11	2	0.537	0.605	0.660	0.669	0.609	0.617	0.580	0.612
2500	1	11	3	0.537	0.640	0.716	0.707	0.669	0.656	0.582	0.645
2500	1	11	4	0.132	0.243	0.251	0.158	0.245	0.379	0.511	0.204
2500	2	1	1	0.797	0.873	0.896	0.781	0.831	0.937	0.869	0.840
2500	2	1	2	0.829	0.881	0.936	0.853	0.854	0.815	0.483	0.872
2500	2	1	3	0.879	0.916	0.943	0.870	0.905	0.959	0.878	0.905
2500	2	1	4	0.039	0.371	0.578	0.083	0.023	0.133	0.142	0.249
2500	2	2	1	0.687	0.759	0.783	0.727	0.761	0.829	0.833	0.742
2500	2	2	2	0.746	0.778	0.811	0.778	0.782	0.719	0.614	0.776
2500	2	2	3	0.784	0.824	0.847	0.810	0.833	0.858	0.842	0.818
2500	2	2	4	0.081	0.268	0.366	0.167	0.138	0.234	0.320	0.213
2500	2	3	1	0.587	0.675	0.716	0.681	0.703	0.737	0.719	0.666
2500	2	3	2	0.628	0.668	0.701	0.690	0.701	0.621	0.551	0.671
2500	2	3	3	0.670	0.744	0.781	0.755	0.768	0.770	0.727	0.737
2500	2	3	4	0.086	0.218	0.286	0.182	0.188	0.230	0.316	0.191
2500	2	4	1	0.530	0.618	0.673	0.652	0.666	0.675	0.650	0.619
2500	2	4	2	0.562	0.588	0.627	0.627	0.638	0.548	0.503	0.601
2500	2	4	3	0.605	0.687	0.739	0.723	0.726	0.709	0.658	0.687
2500	2	4	4	0.083	0.188	0.245	0.177	0.197	0.211	0.296	0.173
2500	2	5	1	0.500	0.578	0.642	0.634	0.638	0.631	0.613	0.588
2500	2	5	2	0.527	0.535	0.575	0.584	0.590	0.499	0.475	0.555
2500	2	5	3	0.570	0.647	0.709	0.705	0.698	0.667	0.621	0.656
2500	2	5	4	0.081	0.169	0.218	0.167	0.192	0.194	0.284	0.159
2500	2	6	1	0.483	0.551	0.618	0.621	0.617	0.601	0.592	0.568
2500	2	6	2	0.507	0.500	0.539	0.555	0.554	0.466	0.459	0.525
2500	2	6	3	0.550	0.620	0.687	0.694	0.677	0.637	0.599	0.635
2500	2	6	4	0.079	0.156	0.200	0.159	0.185	0.182	0.276	0.150
2500	2	7	1	0.472	0.532	0.601	0.612	0.600	0.580	0.578	0.553
2500	2	7	2	0.495	0.476	0.513	0.536	0.529	0.444	0.449	0.504
2500	2	7	3	0.538	0.600	0.670	0.687	0.661	0.617	0.585	0.621
2500	2	7	4	0.078	0.148	0.187	0.152	0.178	0.174	0.271	0.143
2500	2	8	1	0.465	0.519	0.587	0.604	0.588	0.566	0.569	0.543
2500	2	8	2	0.487	0.460	0.495	0.522	0.510	0.428	0.443	0.490
2500	2	8	3	0.530	0.586	0.659	0.683	0.650	0.603	0.576	0.611
2500	2	8	4	0.078	0.142	0.178	0.147	0.172	0.168	0.267	0.137
2500	2	9	1	0.460	0.510	0.577	0.599	0.578	0.555	0.563	0.535
2500	2	9	2	0.481	0.448	0.482	0.513	0.496	0.417	0.438	0.480
2500	2	9	3	0.524	0.576	0.650	0.680	0.641	0.592	0.570	0.604
2500	2	9	4	0.077	0.138	0.172	0.143	0.167	0.164	0.265	0.134
2500	2	10	1	0.457	0.503	0.569	0.595	0.570	0.547	0.559	0.529

2500	2	10	2	0.477	0.439	0.472	0.506	0.486	0.409	0.435	0.472
2500	2	10	3	0.520	0.569	0.643	0.678	0.635	0.584	0.566	0.598
2500	2	10	4	0.077	0.135	0.167	0.140	0.164	0.161	0.263	0.131
2500	2	11	1	0.441	0.470	0.530	0.571	0.533	0.511	0.540	0.500
2500	2	11	2	0.460	0.401	0.428	0.478	0.439	0.373	0.420	0.439
2500	2	11	3	0.502	0.535	0.610	0.670	0.603	0.548	0.546	0.574
2500	2	11	4	0.075	0.122	0.144	0.125	0.146	0.146	0.255	0.118
3000	1	1	1	0.582	0.745	0.776	0.700	0.742	0.917	0.942	0.705
3000	1	1	2	0.856	0.881	0.907	0.879	0.880	0.934	0.944	0.882
3000	1	1	3	0.856	0.881	0.907	0.879	0.880	0.935	0.944	0.882
3000	1	1	4	0.278	0.260	0.257	0.001	0.226	0.829	0.928	0.231
3000	1	2	1	0.542	0.645	0.712	0.618	0.672	0.776	0.774	0.635
3000	1	2	2	0.694	0.768	0.812	0.754	0.770	0.809	0.779	0.758
3000	1	2	3	0.694	0.770	0.816	0.754	0.774	0.812	0.780	0.759
3000	1	2	4	0.201	0.289	0.308	0.053	0.283	0.601	0.727	0.237
3000	1	3	1	0.491	0.593	0.671	0.585	0.641	0.711	0.682	0.590
3000	1	3	2	0.614	0.712	0.765	0.705	0.722	0.744	0.688	0.699
3000	1	3	3	0.614	0.722	0.777	0.706	0.733	0.755	0.690	0.705
3000	1	3	4	0.164	0.286	0.320	0.113	0.301	0.520	0.625	0.239
3000	1	4	1	0.464	0.557	0.636	0.561	0.613	0.668	0.639	0.559
3000	1	4	2	0.577	0.677	0.730	0.679	0.685	0.703	0.645	0.665
3000	1	4	3	0.577	0.694	0.751	0.685	0.705	0.721	0.647	0.676
3000	1	4	4	0.148	0.275	0.315	0.145	0.302	0.475	0.579	0.235
3000	1	5	1	0.450	0.533	0.608	0.542	0.590	0.639	0.617	0.538
3000	1	5	2	0.557	0.656	0.707	0.665	0.659	0.677	0.623	0.644
3000	1	5	3	0.557	0.677	0.735	0.675	0.688	0.701	0.625	0.660
3000	1	5	4	0.140	0.266	0.305	0.160	0.295	0.447	0.556	0.230
3000	1	6	1	0.442	0.518	0.587	0.527	0.571	0.620	0.604	0.523
3000	1	6	2	0.546	0.642	0.691	0.657	0.643	0.661	0.610	0.631
3000	1	6	3	0.546	0.667	0.726	0.672	0.678	0.688	0.612	0.651
3000	1	6	4	0.135	0.258	0.296	0.165	0.288	0.430	0.542	0.225
3000	1	7	1	0.436	0.508	0.571	0.514	0.557	0.607	0.596	0.512
3000	1	7	2	0.539	0.633	0.682	0.653	0.633	0.650	0.602	0.623
3000	1	7	3	0.539	0.660	0.721	0.672	0.673	0.680	0.604	0.646
3000	1	7	4	0.133	0.253	0.288	0.167	0.280	0.418	0.534	0.221
3000	1	8	1	0.433	0.500	0.559	0.504	0.546	0.598	0.591	0.503
3000	1	8	2	0.534	0.627	0.676	0.651	0.626	0.642	0.597	0.618
3000	1	8	3	0.534	0.656	0.718	0.673	0.670	0.674	0.599	0.643
3000	1	8	4	0.131	0.250	0.281	0.167	0.274	0.410	0.529	0.217
3000	1	9	1	0.431	0.495	0.549	0.495	0.537	0.591	0.587	0.497
3000	1	9	2	0.531	0.622	0.671	0.650	0.622	0.637	0.593	0.615
3000	1	9	3	0.531	0.652	0.716	0.675	0.669	0.670	0.595	0.641
3000	1	9	4	0.130	0.247	0.276	0.167	0.270	0.404	0.525	0.214
3000	1	10	1	0.429	0.491	0.542	0.489	0.530	0.586	0.585	0.492
3000	1	10	2	0.529	0.619	0.669	0.649	0.619	0.633	0.591	0.612
3000	1	10	3	0.529	0.650	0.715	0.676	0.668	0.667	0.593	0.639
3000	1	10	4	0.129	0.245	0.272	0.166	0.266	0.399	0.522	0.212
3000	1	11	1	0.421	0.474	0.503	0.451	0.494	0.564	0.573	0.467
3000	1	11	2	0.519	0.604	0.659	0.653	0.609	0.615	0.579	0.603
3000	1	11	3	0.519	0.639	0.713	0.690	0.668	0.653	0.581	0.636
3000	1	11	4	0.125	0.236	0.249	0.158	0.245	0.379	0.511	0.200
3000	2	1	1	0.788	0.869	0.894	0.781	0.831	0.933	0.854	0.837
3000	2	1	2	0.828	0.880	0.935	0.853	0.854	0.809	0.440	0.871
3000	2	1	3	0.874	0.914	0.942	0.870	0.904	0.955	0.863	0.903
3000	2	1	4	0.037	0.367	0.569	0.083	0.023	0.132	0.141	0.245
3000	2	2	1	0.673	0.755	0.780	0.727	0.759	0.825	0.826	0.736
3000	2	2	2	0.733	0.777	0.809	0.777	0.781	0.713	0.594	0.772
3000	2	2	3	0.770	0.822	0.845	0.810	0.832	0.855	0.835	0.813
3000	2	2	4	0.075	0.260	0.360	0.167	0.136	0.230	0.317	0.208
3000	2	3	1	0.572	0.672	0.712	0.679	0.702	0.734	0.715	0.660
3000	2	3	2	0.613	0.667	0.700	0.687	0.700	0.615	0.538	0.665

3000	2	3	3	0.654	0.742	0.778	0.752	0.767	0.766	0.723	0.731
3000	2	3	4	0.079	0.211	0.282	0.182	0.186	0.226	0.312	0.186
3000	2	4	1	0.517	0.614	0.669	0.649	0.665	0.671	0.647	0.613
3000	2	4	2	0.548	0.587	0.625	0.623	0.637	0.543	0.492	0.595
3000	2	4	3	0.590	0.685	0.736	0.718	0.725	0.705	0.654	0.681
3000	2	4	4	0.077	0.182	0.241	0.177	0.195	0.207	0.293	0.169
3000	2	5	1	0.487	0.575	0.638	0.630	0.637	0.628	0.610	0.582
3000	2	5	2	0.513	0.534	0.573	0.579	0.588	0.494	0.466	0.549
3000	2	5	3	0.555	0.645	0.706	0.698	0.696	0.663	0.617	0.649
3000	2	5	4	0.075	0.164	0.215	0.167	0.191	0.191	0.280	0.156
3000	2	6	1	0.470	0.548	0.614	0.617	0.615	0.598	0.588	0.562
3000	2	6	2	0.493	0.499	0.537	0.550	0.553	0.461	0.450	0.519
3000	2	6	3	0.536	0.617	0.684	0.687	0.675	0.634	0.596	0.629
3000	2	6	4	0.073	0.152	0.198	0.159	0.183	0.179	0.273	0.146
3000	2	7	1	0.460	0.529	0.596	0.608	0.599	0.577	0.575	0.547
3000	2	7	2	0.481	0.476	0.512	0.530	0.527	0.439	0.441	0.499
3000	2	7	3	0.523	0.598	0.667	0.681	0.660	0.614	0.582	0.614
3000	2	7	4	0.073	0.143	0.185	0.152	0.176	0.171	0.267	0.139
3000	2	8	1	0.453	0.516	0.583	0.600	0.586	0.563	0.566	0.537
3000	2	8	2	0.473	0.459	0.494	0.517	0.509	0.424	0.434	0.485
3000	2	8	3	0.515	0.584	0.655	0.676	0.648	0.600	0.573	0.604
3000	2	8	4	0.072	0.138	0.176	0.147	0.171	0.166	0.264	0.134
3000	2	9	1	0.448	0.507	0.572	0.595	0.576	0.552	0.560	0.529
3000	2	9	2	0.468	0.448	0.480	0.508	0.495	0.413	0.430	0.474
3000	2	9	3	0.510	0.574	0.646	0.673	0.640	0.589	0.567	0.597
3000	2	9	4	0.071	0.134	0.170	0.143	0.166	0.161	0.262	0.131
3000	2	10	1	0.445	0.500	0.565	0.591	0.569	0.544	0.556	0.523
3000	2	10	2	0.464	0.439	0.471	0.501	0.485	0.405	0.427	0.467
3000	2	10	3	0.506	0.567	0.639	0.671	0.633	0.581	0.563	0.592
3000	2	10	4	0.071	0.131	0.165	0.140	0.163	0.158	0.260	0.128
3000	2	11	1	0.430	0.467	0.526	0.567	0.531	0.508	0.537	0.495
3000	2	11	2	0.446	0.401	0.426	0.473	0.438	0.369	0.412	0.434
3000	2	11	3	0.489	0.533	0.606	0.664	0.601	0.545	0.544	0.567
3000	2	11	4	0.070	0.118	0.142	0.125	0.145	0.144	0.252	0.115
3500	1	1	1	0.503	0.738	0.775	0.700	0.742	0.917	0.942	0.682
3500	1	1	2	0.773	0.877	0.907	0.879	0.880	0.934	0.944	0.858
3500	1	1	3	0.773	0.877	0.907	0.879	0.880	0.935	0.944	0.858
3500	1	1	4	0.252	0.232	0.254	0.001	0.226	0.829	0.928	0.218
3500	1	2	1	0.440	0.640	0.711	0.617	0.672	0.776	0.774	0.605
3500	1	2	2	0.581	0.763	0.812	0.752	0.770	0.809	0.779	0.725
3500	1	2	3	0.581	0.765	0.816	0.752	0.774	0.812	0.780	0.727
3500	1	2	4	0.184	0.274	0.305	0.053	0.283	0.601	0.727	0.228
3500	1	3	1	0.389	0.587	0.670	0.583	0.641	0.711	0.682	0.561
3500	1	3	2	0.500	0.707	0.765	0.701	0.722	0.744	0.688	0.666
3500	1	3	3	0.500	0.716	0.777	0.703	0.733	0.755	0.689	0.672
3500	1	3	4	0.150	0.276	0.317	0.113	0.301	0.520	0.625	0.232
3500	1	4	1	0.365	0.551	0.634	0.559	0.613	0.668	0.639	0.530
3500	1	4	2	0.464	0.672	0.730	0.675	0.685	0.703	0.645	0.632
3500	1	4	3	0.464	0.688	0.751	0.680	0.705	0.721	0.647	0.643
3500	1	4	4	0.135	0.266	0.313	0.145	0.302	0.475	0.579	0.230
3500	1	5	1	0.352	0.527	0.606	0.540	0.590	0.639	0.617	0.509
3500	1	5	2	0.446	0.651	0.707	0.661	0.659	0.677	0.623	0.612
3500	1	5	3	0.446	0.672	0.735	0.671	0.687	0.701	0.624	0.628
3500	1	5	4	0.128	0.258	0.304	0.160	0.295	0.447	0.556	0.225
3500	1	6	1	0.344	0.512	0.585	0.524	0.571	0.620	0.604	0.494
3500	1	6	2	0.435	0.637	0.691	0.653	0.643	0.661	0.610	0.599
3500	1	6	3	0.435	0.661	0.725	0.667	0.678	0.688	0.612	0.619
3500	1	6	4	0.124	0.251	0.294	0.165	0.288	0.430	0.542	0.220
3500	1	7	1	0.340	0.502	0.569	0.512	0.556	0.607	0.596	0.483
3500	1	7	2	0.429	0.628	0.682	0.648	0.633	0.650	0.602	0.591
3500	1	7	3	0.429	0.654	0.720	0.667	0.672	0.680	0.604	0.614

3500	1	7	4	0.121	0.246	0.286	0.167	0.280	0.418	0.534	0.216
3500	1	8	1	0.337	0.495	0.556	0.501	0.545	0.597	0.591	0.475
3500	1	8	2	0.425	0.622	0.676	0.646	0.626	0.642	0.597	0.586
3500	1	8	3	0.425	0.650	0.717	0.668	0.670	0.674	0.599	0.611
3500	1	8	4	0.120	0.243	0.280	0.167	0.274	0.410	0.529	0.213
3500	1	9	1	0.335	0.489	0.547	0.493	0.536	0.591	0.587	0.468
3500	1	9	2	0.422	0.617	0.671	0.645	0.622	0.637	0.593	0.583
3500	1	9	3	0.422	0.647	0.715	0.670	0.668	0.670	0.595	0.609
3500	1	9	4	0.119	0.241	0.275	0.167	0.270	0.404	0.525	0.210
3500	1	10	1	0.333	0.486	0.539	0.487	0.529	0.586	0.585	0.464
3500	1	10	2	0.420	0.614	0.669	0.645	0.619	0.633	0.591	0.581
3500	1	10	3	0.420	0.644	0.714	0.671	0.667	0.667	0.592	0.607
3500	1	10	4	0.118	0.239	0.271	0.166	0.266	0.399	0.522	0.208
3500	1	11	1	0.326	0.468	0.500	0.449	0.493	0.563	0.573	0.439
3500	1	11	2	0.411	0.599	0.659	0.649	0.609	0.615	0.579	0.572
3500	1	11	3	0.411	0.633	0.712	0.685	0.667	0.653	0.581	0.604
3500	1	11	4	0.114	0.230	0.248	0.158	0.245	0.379	0.511	0.196
3500	2	1	1	0.778	0.862	0.893	0.780	0.830	0.931	0.839	0.832
3500	2	1	2	0.823	0.874	0.935	0.852	0.854	0.808	0.403	0.868
3500	2	1	3	0.866	0.909	0.941	0.870	0.904	0.954	0.847	0.899
3500	2	1	4	0.036	0.334	0.566	0.081	0.023	0.132	0.138	0.237
3500	2	2	1	0.633	0.750	0.779	0.726	0.758	0.823	0.817	0.723
3500	2	2	2	0.693	0.773	0.809	0.777	0.778	0.710	0.568	0.759
3500	2	2	3	0.727	0.818	0.844	0.809	0.831	0.853	0.825	0.800
3500	2	2	4	0.067	0.243	0.354	0.165	0.134	0.230	0.312	0.200
3500	2	3	1	0.527	0.666	0.710	0.678	0.700	0.732	0.708	0.645
3500	2	3	2	0.565	0.663	0.699	0.686	0.697	0.612	0.520	0.651
3500	2	3	3	0.604	0.738	0.777	0.750	0.765	0.764	0.716	0.716
3500	2	3	4	0.071	0.200	0.277	0.181	0.183	0.225	0.308	0.180
3500	2	4	1	0.472	0.609	0.666	0.647	0.663	0.669	0.641	0.598
3500	2	4	2	0.499	0.584	0.624	0.621	0.634	0.540	0.477	0.580
3500	2	4	3	0.540	0.681	0.734	0.715	0.724	0.704	0.649	0.665
3500	2	4	4	0.069	0.174	0.238	0.176	0.192	0.206	0.289	0.164
3500	2	5	1	0.443	0.570	0.634	0.628	0.635	0.626	0.605	0.568
3500	2	5	2	0.465	0.531	0.572	0.578	0.586	0.491	0.452	0.535
3500	2	5	3	0.506	0.641	0.703	0.696	0.695	0.661	0.612	0.634
3500	2	5	4	0.067	0.157	0.212	0.166	0.188	0.190	0.276	0.151
3500	2	6	1	0.427	0.543	0.610	0.615	0.613	0.596	0.584	0.547
3500	2	6	2	0.446	0.496	0.536	0.548	0.550	0.458	0.438	0.505
3500	2	6	3	0.487	0.613	0.680	0.685	0.674	0.632	0.591	0.613
3500	2	6	4	0.066	0.145	0.195	0.158	0.180	0.178	0.269	0.142
3500	2	7	1	0.417	0.524	0.592	0.606	0.597	0.575	0.571	0.533
3500	2	7	2	0.434	0.473	0.510	0.529	0.525	0.437	0.428	0.485
3500	2	7	3	0.476	0.594	0.664	0.678	0.658	0.612	0.578	0.599
3500	2	7	4	0.065	0.138	0.183	0.151	0.174	0.170	0.264	0.135
3500	2	8	1	0.410	0.511	0.579	0.598	0.584	0.561	0.562	0.523
3500	2	8	2	0.427	0.457	0.492	0.515	0.506	0.421	0.422	0.470
3500	2	8	3	0.468	0.580	0.652	0.673	0.646	0.598	0.569	0.589
3500	2	8	4	0.065	0.133	0.174	0.146	0.168	0.164	0.260	0.130
3500	2	9	1	0.406	0.502	0.569	0.593	0.574	0.550	0.556	0.515
3500	2	9	2	0.421	0.445	0.479	0.506	0.493	0.411	0.418	0.460
3500	2	9	3	0.463	0.570	0.643	0.670	0.638	0.587	0.563	0.582
3500	2	9	4	0.064	0.129	0.168	0.142	0.164	0.160	0.258	0.127
3500	2	10	1	0.402	0.495	0.561	0.589	0.567	0.542	0.552	0.509
3500	2	10	2	0.418	0.436	0.469	0.499	0.483	0.403	0.415	0.453
3500	2	10	3	0.459	0.563	0.636	0.668	0.631	0.579	0.559	0.577
3500	2	10	4	0.064	0.126	0.163	0.139	0.160	0.157	0.256	0.124
3500	2	11	1	0.388	0.463	0.522	0.565	0.529	0.506	0.533	0.481
3500	2	11	2	0.401	0.398	0.424	0.471	0.436	0.367	0.401	0.420
3500	2	11	3	0.443	0.528	0.603	0.661	0.599	0.544	0.540	0.552
3500	2	11	4	0.063	0.114	0.141	0.124	0.143	0.143	0.249	0.111

4000	1	1	1	0.491	0.733	0.770	0.700	0.742	0.917	0.942	0.676
4000	1	1	2	0.758	0.865	0.901	0.879	0.880	0.934	0.944	0.850
4000	1	1	3	0.758	0.865	0.901	0.879	0.880	0.935	0.944	0.850
4000	1	1	4	0.240	0.211	0.252	0.001	0.226	0.829	0.927	0.210
4000	1	2	1	0.422	0.636	0.706	0.616	0.672	0.776	0.774	0.598
4000	1	2	2	0.560	0.755	0.805	0.750	0.770	0.809	0.779	0.716
4000	1	2	3	0.560	0.757	0.809	0.750	0.774	0.812	0.780	0.718
4000	1	2	4	0.174	0.259	0.301	0.053	0.283	0.601	0.725	0.222
4000	1	3	1	0.372	0.583	0.665	0.581	0.641	0.711	0.681	0.553
4000	1	3	2	0.480	0.700	0.758	0.697	0.722	0.743	0.688	0.657
4000	1	3	3	0.480	0.709	0.770	0.698	0.733	0.754	0.689	0.663
4000	1	3	4	0.141	0.264	0.314	0.113	0.301	0.520	0.623	0.227
4000	1	4	1	0.348	0.547	0.629	0.556	0.613	0.667	0.638	0.523
4000	1	4	2	0.445	0.666	0.724	0.669	0.685	0.701	0.645	0.623
4000	1	4	3	0.445	0.681	0.744	0.674	0.704	0.719	0.647	0.634
4000	1	4	4	0.127	0.256	0.310	0.145	0.302	0.475	0.577	0.225
4000	1	5	1	0.336	0.523	0.601	0.536	0.589	0.638	0.616	0.502
4000	1	5	2	0.428	0.644	0.700	0.653	0.659	0.675	0.623	0.603
4000	1	5	3	0.428	0.665	0.728	0.663	0.687	0.698	0.624	0.618
4000	1	5	4	0.120	0.249	0.301	0.160	0.295	0.447	0.554	0.220
4000	1	6	1	0.329	0.508	0.580	0.521	0.570	0.619	0.603	0.487
4000	1	6	2	0.418	0.631	0.685	0.644	0.643	0.659	0.610	0.590
4000	1	6	3	0.418	0.654	0.719	0.659	0.677	0.685	0.612	0.609
4000	1	6	4	0.116	0.243	0.292	0.165	0.288	0.430	0.540	0.216
4000	1	7	1	0.324	0.497	0.564	0.508	0.556	0.606	0.595	0.476
4000	1	7	2	0.411	0.622	0.676	0.640	0.633	0.648	0.602	0.583
4000	1	7	3	0.411	0.648	0.713	0.659	0.672	0.677	0.604	0.604
4000	1	7	4	0.114	0.238	0.284	0.167	0.280	0.418	0.532	0.212
4000	1	8	1	0.321	0.490	0.551	0.498	0.544	0.597	0.590	0.468
4000	1	8	2	0.407	0.616	0.670	0.638	0.626	0.640	0.597	0.578
4000	1	8	3	0.407	0.643	0.710	0.659	0.669	0.671	0.599	0.601
4000	1	8	4	0.112	0.235	0.277	0.167	0.274	0.410	0.527	0.208
4000	1	9	1	0.319	0.485	0.542	0.489	0.535	0.590	0.587	0.462
4000	1	9	2	0.405	0.611	0.666	0.637	0.622	0.634	0.593	0.574
4000	1	9	3	0.405	0.640	0.709	0.661	0.667	0.667	0.595	0.599
4000	1	9	4	0.111	0.233	0.272	0.167	0.270	0.404	0.523	0.206
4000	1	10	1	0.318	0.481	0.535	0.483	0.528	0.585	0.584	0.457
4000	1	10	2	0.403	0.608	0.663	0.636	0.619	0.630	0.590	0.572
4000	1	10	3	0.403	0.638	0.708	0.662	0.666	0.664	0.592	0.598
4000	1	10	4	0.111	0.231	0.268	0.166	0.266	0.399	0.521	0.204
4000	1	11	1	0.312	0.464	0.496	0.445	0.492	0.563	0.573	0.432
4000	1	11	2	0.394	0.593	0.654	0.640	0.609	0.612	0.579	0.564
4000	1	11	3	0.394	0.627	0.706	0.676	0.666	0.649	0.581	0.595
4000	1	11	4	0.107	0.223	0.246	0.158	0.245	0.379	0.509	0.192
4000	2	1	1	0.767	0.856	0.893	0.780	0.829	0.928	0.819	0.828
4000	2	1	2	0.817	0.870	0.934	0.852	0.853	0.806	0.349	0.866
4000	2	1	3	0.856	0.904	0.941	0.870	0.903	0.952	0.825	0.895
4000	2	1	4	0.033	0.308	0.565	0.080	0.023	0.132	0.137	0.231
4000	2	2	1	0.613	0.745	0.777	0.725	0.757	0.820	0.805	0.716
4000	2	2	2	0.674	0.770	0.806	0.776	0.775	0.702	0.537	0.752
4000	2	2	3	0.707	0.813	0.842	0.808	0.830	0.850	0.813	0.793
4000	2	2	4	0.060	0.228	0.352	0.164	0.133	0.227	0.309	0.195
4000	2	3	1	0.508	0.661	0.707	0.676	0.699	0.728	0.700	0.638
4000	2	3	2	0.547	0.660	0.695	0.684	0.694	0.604	0.498	0.643
4000	2	3	3	0.585	0.733	0.772	0.748	0.764	0.761	0.708	0.708
4000	2	3	4	0.065	0.190	0.275	0.180	0.181	0.221	0.305	0.176
4000	2	4	1	0.455	0.604	0.661	0.645	0.661	0.666	0.635	0.591
4000	2	4	2	0.482	0.581	0.619	0.619	0.631	0.533	0.460	0.573
4000	2	4	3	0.522	0.676	0.728	0.712	0.722	0.700	0.642	0.658
4000	2	4	4	0.063	0.166	0.236	0.175	0.190	0.203	0.286	0.160
4000	2	5	1	0.427	0.565	0.628	0.626	0.633	0.623	0.599	0.561

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4000 2  5 2  0.450 0.528 0.567 0.575 0.583 0.485 0.437 0.528
4000 2  5 3  0.490 0.636 0.696 0.692 0.693 0.658 0.606 0.626
4000 2  5 4  0.062 0.150 0.211 0.166 0.186 0.187 0.274 0.148
4000 2  6 1  0.412 0.538 0.604 0.613 0.612 0.593 0.578 0.540
4000 2  6 2  0.431 0.493 0.530 0.545 0.548 0.453 0.423 0.498
4000 2  6 3  0.472 0.608 0.673 0.681 0.672 0.628 0.585 0.605
4000 2  6 4  0.061 0.139 0.194 0.157 0.179 0.175 0.266 0.139
4000 2  7 1  0.402 0.520 0.586 0.603 0.595 0.572 0.565 0.526
4000 2  7 2  0.420 0.470 0.504 0.526 0.523 0.431 0.414 0.478
4000 2  7 3  0.460 0.589 0.656 0.674 0.656 0.608 0.572 0.591
4000 2  7 4  0.060 0.132 0.181 0.151 0.172 0.167 0.262 0.132
4000 2  8 1  0.396 0.507 0.572 0.596 0.582 0.558 0.557 0.515
4000 2  8 2  0.412 0.454 0.486 0.512 0.504 0.416 0.409 0.464
4000 2  8 3  0.453 0.575 0.644 0.669 0.645 0.594 0.564 0.581
4000 2  8 4  0.059 0.127 0.173 0.146 0.167 0.161 0.258 0.127
4000 2  9 1  0.391 0.498 0.561 0.590 0.572 0.547 0.551 0.508
4000 2  9 2  0.407 0.442 0.473 0.503 0.491 0.405 0.405 0.454
4000 2  9 3  0.448 0.565 0.635 0.666 0.636 0.584 0.558 0.574
4000 2  9 4  0.059 0.124 0.166 0.142 0.162 0.157 0.256 0.124
4000 2 10 1  0.388 0.491 0.553 0.586 0.565 0.540 0.547 0.502
4000 2 10 2  0.403 0.433 0.463 0.496 0.481 0.398 0.402 0.446
4000 2 10 3  0.444 0.558 0.628 0.664 0.629 0.576 0.554 0.569
4000 2 10 4  0.059 0.121 0.162 0.139 0.159 0.154 0.254 0.121
4000 2 11 1  0.375 0.459 0.514 0.562 0.527 0.504 0.528 0.474
4000 2 11 2  0.388 0.395 0.418 0.468 0.435 0.362 0.389 0.414
4000 2 11 3  0.428 0.524 0.594 0.656 0.597 0.540 0.535 0.544
4000 2 11 4  0.058 0.109 0.139 0.124 0.142 0.140 0.247 0.109
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bprio

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******* bprio - Blue Weapon Selection Table ************
*************************************************************
*
* Firer   Tgt     Range
* Unit    Unit    Band      Min     Max
* Type    Type    Num       Range   Range   Priority   Weapon
* -----  ------  ------    -----   -----   --------   ------
  'BTNK'  'RTNK'   1          0     3500        1      'BKE1'
                                                2      'NULL'
                                                3      'NULL'
* -----  ------  ------    -----   -----   --------   ------
                   2       3500    5000        1      'NULL'
                                                2      'NULL'
                                                3      'NULL'
* -----  ------  ------    -----   -----   --------   ------
                   3       5000    6000        1      'NULL'
                                                2      'NULL'
                                                3      'NULL'
* -----  ------  ------    -----   -----   --------   ------
  'BTNK'  'RAPC'   1          0     3500        1      'BKE1'
                                                2      'NULL'
                                                3      'NULL'
* -----  ------  ------    -----   -----   --------   ------
                   2       3500    5000        1      'NULL'
                                                2      'NULL'
                                                3      'NULL'
* -----  ------  ------    -----   -----   --------   ------
                   3       5000    6000        1      'NULL'
                                                2      'NULL'
                                                3      'NULL'
```

```
* ------------------------------------------------------
```

bsens

```
**********************bsens.**********************************
'BTNK'
 'THERMAL'
 'TWENTY'
-- NFOV
     0.02   0.3    0.04   0.05   0.06   0.07   0.08   0.10   0.15   0.23
     0.4    0.5    0.6    1.0    1.5    2.0    3.0    4.2    6.0    9.0
     1.0    1.4    1.9    2.3    3.0    3.5    4.0    4.5    5.0    5.5
     6.0    6.5    7.0    7.4    7.8    8.2    8.6    8.8    8.9    9.0
-- WFOV
     0.02   0.3    0.04   0.05   0.06   0.07   0.08   0.10   0.15   0.23
     0.4    0.5    0.6    1.0    1.5    2.0    3.0    4.2    6.0    9.0
     0.3    0.4    0.5    0.6    0.7    0.8    0.9    1.0    1.1    1.2
     1.4    1.6    1.8    2.0    2.2    2.4    2.6    2.8    3.0    3.2
-- Horizontal FOS, Vertical FOS
        32.0              12.0
-- Horizontal NFOV, Vertical NFOV
        2.4               3.8
-- Horizontal WFOV, Vertical WFOV
        8.4              16.8
-- NFOV Magnification, WFOV Magnification
        1.0               1.0
-- NFOV Stat Acq Level, NFOV Mov Acq Level
         4.0             4.0
-- WFOV Stat Acq Level, WFOV Mov Acq Level
        1.5              1.0
-- N(dets), pfalse(HD), pfalse(FE)
      1        0.0        0.0
-- Pinpoint probabilities
 'RKE1' 0.03
 'RMI1' 0.03
 'RMI2' 0.03
 'END'
```

bunit

```
********************* blue army ****************************************
*************************************************************************
* unit          type  exposure loc  vehicle  weap1   weap2   weap3 sensor
'BTNK'  4  'Defender' 'FE'  4000. 'BTNK' 'BKE1'  'NULL' 'NULL'  'BTNK'
```

bveh

```
*********************************************
'BTNK'
  Turret Dimensions:  H, W, FL, BL
           0.7    1.3     2.0     2.0
  Hull Dimensions: H, W, FL, BL
           1.4     1.75    3.3     3.3
  Target Acquisition variables:
          0.3   0.6     Opt cont
          0.2   0.8     Th cont
          0.8   3.0     Char Dim
         20.0   40.0    Radar Cross Section
```

```
 Movement: Speed, Accel, Decel, Pausedf
        3.333  1.000   2.000    0
 Times to Leave: Break Los, Empty, F-killed
         10.00    30.00   130.00
 Act Prot: Arc, Prob Det,
          0.   0
 Smoke Grenades: Ngrnd, Prob, Smokes,Durat
          0 0.00 0.00 0.00 0.00 0.00 0.00
   Laser Warning Inputs: If-lwr  pop-smk  engage  hide  #Fovs  Tsearch
        F   0.0  F   F  F  0.0  0.0
```

bweap

```
*****************************************
'BKE1'
 Weap: Kind,firemax,nrds,halt,tact,nrpt,lrf,ilo,rinc iEMG
         1    3500.  45   0     1   0    T   F  500.  F
 values by range:psense,tof,tfirst,tfix,reliab
  8*0.0
  0.2   0.4   0.7   1.0  1.4   1.8   2.0   2.4
  6.0   7.0   8.0   9.0  10.0  11.0  12.0  13.0
  8*0.0
  8*.99
 Jockey: ifpop, ntfjoc, timjoc
         0    0    30.0
 Times: tmedin, tmin
          10.0     0.0
 Rof, nrpb
           1.0    1
 Missile: ifdis,nipods,ntgts,trelod,pabtsm,pabtterr
           0      0    0     0.0   0.00   0.00
 Multiple: ifmult,tmult,nmult,can reload
         0     0.0    0   0
```

game

```
red attack      *scenario description: red,blue,meeting
Al Mafraq       *terrain specification:hunfeld,peine,eschen,almafraqother
frontal         *attack distribution
10.0 0.39 0.24 *visibility range, optical & thermal attenuations
0 0 2 0 0 1 0  *output control flags
33*0
1050.           * maximum battle time
60.  500.       * output increments: time, range
10000  11111111  *nreps, initial seed
1   5.0         *pinpoint restriction: 0=none, 1=pinfinity; ID-call
95.  .05        *conf level, rel width
```

racc1

```
'RKE1'
8 ranges
* STATIONARY vs STATIONARY  1st Round
*            fix bias  var bias   ran err
*  rg (m)     H    V    H    V    H    V
      500   .000 .000 .000 .000 2.00 2.00
     1000   .000 .000 .000 .000 1.00 1.00
     1500   .000 .000 .000 .000 .700 .700
```

h/h ran err		h/lm ran err		h/sm ran err	
H	V	H	V	H	V
2.00	2.00	2.00	2.00	2.00	2.00
1.00	1.00	1.00	1.00	1.00	1.00
.700	.700	.700	.700	.700	.700

```
     2000   .000 .000 .000 .000 .500 .500     .500 .500 .500 .500 .500 .500
     2500   .000 .000 .000 .000 .500 .500     .500 .500 .500 .500 .500 .500
     3000   .000 .000 .000 .000 .500 .500     .500 .500 .500 .500 .500 .500
     3500   .000 .000 .000 .000 .500 .500     .500 .500 .500 .500 .500 .500
     4000   .000 .000 .000 .000 .500 .500     .500 .500 .500 .500 .500 .500
* STATIONARY vs MOVING TARGET - 0 deg, 30, 60 90
*                  fixed bias                 total error
*  rg (m)        H          V              H          V
      500       .000       .000           2.00       2.00
     1000       .000       .000           1.00       1.00
     1500       .000       .000           .700       .500
     2000       .000       .000           .500       .500
     5000       .000       .000           .500       .500
     3000       .000       .000           .500       .500
     3500       .000       .000           .500       .500
     4000       .000       .000           .500       .500
** 30 DEG
      500       .000       .000           2.00       2.00
     1000       .000       .000           1.00       1.00
     1500       .000       .000           .700       .500
     2000       .000       .000           .500       .500
     5000       .000       .000           .500       .500
     3000       .000       .000           .500       .500
     3500       .000       .000           .500       .500
     4000       .000       .000           .500       .500
** 60 DEG
      500       .000       .000           2.00       2.00
     1000       .000       .000           1.00       1.00
     1500       .000       .000           .700       .500
     2000       .000       .000           .500       .500
     5000       .000       .000           .500       .500
     3000       .000       .000           .500       .500
     3500       .000       .000           .500       .500
     4000       .000       .000           .500       .500
** 90 DEG
      500       .000       .000           2.00       2.00
     1000       .000       .000           1.00       1.00
     1500       .000       .000           .700       .500
     2000       .000       .000           .500       .500
     5000       .000       .000           .500       .500
     3000       .000       .000           .500       .500
     3500       .000       .000           .500       .500
     4000       .000       .000           .500       .500
* MOVING vs STATIONARY TARGET
      500        .000      .000           2.00      2.00
     1000        .000      .000           1.00      1.00
     1500        .000      .000           .700      .500
     2000        .000      .000           .500      .500
     5000        .000      .000           .500      .500
     3000        .000      .000           .500      .500
     3500        .000      .000           .500      .500
     4000        .000      .000           .500      .500
```

racc2

```
'RMI1'
8 ranges
* STATIONARY vs STATIONARY  1st Round                h/h       h/lm       h/sm
*              fix bias  var bias   ran err        ran err    ran err    ran err
*  rg (m)      H    V    H    V    H    V          H    V     H    V     H    V
```

500	.000	.000	.000	.000	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1000	.000	.000	.000	.000	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
1500	.000	.000	.000	.000	.720	.720	.720	.720	.720	.720	.720	.720
2000	.000	.000	.000	.000	.520	.520	.520	.520	.520	.520	.520	.520
2500	.000	.000	.000	.000	.520	.520	.520	.520	.520	.520	.520	.520
3000	.000	.000	.000	.000	.520	.520	.520	.520	.520	.520	.520	.520
3500	.000	.000	.000	.000	.520	.520	.520	.520	.520	.520	.520	.520
4000	.000	.000	.000	.000	.520	.520	.520	.520	.520	.520	.520	.520

* STATIONARY vs MOVING TARGET - 0 deg, 30, 60 90

*	fixed bias		total error	
* rg (m)	H	V	H	V
500	.000	.000	2.20	2.20
1000	.000	.000	1.20	1.20
1500	.000	.000	.720	.520
2000	.000	.000	.520	.520
5000	.000	.000	.520	.520
3000	.000	.000	.520	.520
3500	.000	.000	.520	.520
4000	.000	.000	.520	.520
** 30 DEG				
500	.000	.000	2.20	2.20
1000	.000	.000	1.20	1.20
1500	.000	.000	.720	.520
2000	.000	.000	.520	.520
5000	.000	.000	.520	.520
3000	.000	.000	.520	.520
3500	.000	.000	.520	.520
4000	.000	.000	.520	.520
** 60 DEG				
500	.000	.000	2.20	2.20
1000	.000	.000	1.20	1.20
1500	.000	.000	.720	.520
2000	.000	.000	.520	.520
5000	.000	.000	.520	.520
3000	.000	.000	.520	.520
3500	.000	.000	.520	.520
4000	.000	.000	.520	.520
** 90 DEG				
500	.000	.000	2.20	2.20
1000	.000	.000	1.20	1.20
1500	.000	.000	.720	.520
2000	.000	.000	.520	.520
5000	.000	.000	.520	.520
3000	.000	.000	.520	.520
3500	.000	.000	.520	.520
4000	.000	.000	.520	.520

* MOVING vs STATIONARY TARGET

500	.000	.000	2.20	2.20
1000	.000	.000	1.20	1.20
1500	.000	.000	.720	.520
2000	.000	.000	.520	.520
5000	.000	.000	.520	.520
3000	.000	.000	.520	.520
3500	.000	.000	.520	.520
4000	.000	.000	.520	.520

racc3

'RMI2'
8 ranges

* STATIONARY vs STATIONARY 1st Round

* rg (m)	fix bias H	fix bias V	var bias H	var bias V	ran err H	ran err V	h/h ran err H	h/h ran err V	h/1m ran err H	h/1m ran err V	h/sm ran err H	h/sm ran err V
500	.000	.000	.000	.000	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1000	.000	.000	.000	.000	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
1500	.000	.000	.000	.000	.720	.720	.720	.720	.720	.720	.720	.720
2000	.000	.000	.000	.000	.520	.520	.520	.520	.520	.520	.520	.520
2500	.000	.000	.000	.000	.520	.520	.520	.520	.520	.520	.520	.520
3000	.000	.000	.000	.000	.520	.520	.520	.520	.520	.520	.520	.520
3500	.000	.000	.000	.000	.520	.520	.520	.520	.520	.520	.520	.520
4000	.000	.000	.000	.000	.520	.520	.520	.520	.520	.520	.520	.520

* STATIONARY vs MOVING TARGET - 0 deg, 30, 60 90

* rg (m)	fixed bias H	fixed bias V	total error H	total error V
500	.000	.000	2.20	2.20
1000	.000	.000	1.20	1.20
1500	.000	.000	.720	.520
2000	.000	.000	.520	.520
5000	.000	.000	.520	.520
3000	.000	.000	.520	.520
3500	.000	.000	.520	.520
4000	.000	.000	.520	.520
** 30 DEG				
500	.000	.000	2.20	2.20
1000	.000	.000	1.20	1.20
1500	.000	.000	.720	.520
2000	.000	.000	.520	.520
5000	.000	.000	.520	.520
3000	.000	.000	.520	.520
3500	.000	.000	.520	.520
4000	.000	.000	.520	.520
** 60 DEG				
500	.000	.000	2.20	2.20
1000	.000	.000	1.20	1.20
1500	.000	.000	.720	.520
2000	.000	.000	.520	.520
5000	.000	.000	.520	.520
3000	.000	.000	.520	.520
3500	.000	.000	.520	.520
4000	.000	.000	.520	.520
** 90 DEG				
500	.000	.000	2.20	2.20
1000	.000	.000	1.20	1.20
1500	.000	.000	.720	.520
2000	.000	.000	.520	.520
5000	.000	.000	.520	.520
3000	.000	.000	.520	.520
3500	.000	.000	.520	.520
4000	.000	.000	.520	.520

* MOVING vs STATIONARY TARGET

500	.000	.000	2.20	2.20
1000	.000	.000	1.20	1.20
1500	.000	.000	.720	.520
2000	.000	.000	.520	.520
5000	.000	.000	.520	.520
3000	.000	.000	.520	.520
3500	.000	.000	.520	.520
4000	.000	.000	.520	.520

rarmy

```
**********************************
*  Red Army file
Priority of targets     Time to go back     Nbump     Tbump
        2                  60.0               2        30.0    1
Communication:         if commo     pcomm     tcomm    tsearch
                         0           0.0       0.0       0.0
Decoys:    VEH Name    Nflash   T-flash    R-flash
             'NULL'      0       0.0        0.0
Artillery: if artillery
      0
```

rpk1

```
** rkvb.iua
'RKE1' 'BTNK'
1   0
**    Generic (Unclassified) PK data
            0 1  1 1  0.645 0.774 0.784 0.700 0.742 0.917 0.942 0.730
            0 1  1 2  0.895 0.911 0.907 0.880 0.880 0.934 0.944 0.898
            0 1  1 3  0.895 0.911 0.907 0.880 0.880 0.935 0.944 0.898
            0 1  1 4  0.414 0.345 0.289 0.001 0.226 0.829 0.928 0.293
            0 1  2 1  0.614 0.677 0.720 0.625 0.672 0.777 0.774 0.664
            0 1  2 2  0.749 0.785 0.812 0.764 0.770 0.810 0.780 0.778
            0 1  2 3  0.749 0.788 0.817 0.764 0.774 0.814 0.781 0.780
            0 1  2 4  0.388 0.348 0.323 0.053 0.283 0.601 0.727 0.304
            0 1  3 1  0.559 0.624 0.685 0.600 0.642 0.713 0.682 0.621
            0 1  3 2  0.666 0.728 0.768 0.732 0.722 0.747 0.688 0.721
            0 1  3 3  0.666 0.738 0.781 0.733 0.734 0.759 0.690 0.729
            0 1  3 4  0.349 0.330 0.331 0.113 0.301 0.520 0.625 0.301
            0 1  4 1  0.529 0.587 0.654 0.580 0.615 0.671 0.639 0.591
            0 1  4 2  0.626 0.693 0.734 0.715 0.685 0.707 0.645 0.688
            0 1  4 3  0.626 0.711 0.757 0.721 0.707 0.727 0.647 0.701
            0 1  4 4  0.330 0.312 0.324 0.145 0.302 0.475 0.579 0.295
            0 1  5 1  0.513 0.563 0.629 0.562 0.592 0.643 0.617 0.570
            0 1  5 2  0.605 0.671 0.711 0.704 0.660 0.682 0.623 0.668
            0 1  5 3  0.605 0.694 0.742 0.715 0.691 0.708 0.625 0.686
            0 1  5 4  0.319 0.298 0.313 0.160 0.295 0.447 0.556 0.288
            0 1  6 1  0.504 0.547 0.609 0.547 0.574 0.624 0.604 0.555
            0 1  6 2  0.593 0.657 0.696 0.697 0.644 0.666 0.610 0.655
            0 1  6 3  0.593 0.684 0.734 0.714 0.682 0.696 0.612 0.677
            0 1  6 4  0.313 0.289 0.303 0.165 0.288 0.430 0.542 0.281
            0 1  7 1  0.498 0.537 0.593 0.535 0.560 0.611 0.596 0.544
            0 1  7 2  0.585 0.647 0.687 0.693 0.634 0.655 0.602 0.647
            0 1  7 3  0.585 0.678 0.729 0.714 0.678 0.688 0.605 0.672
            0 1  7 4  0.309 0.282 0.294 0.167 0.280 0.418 0.534 0.276
            0 1  8 1  0.494 0.529 0.581 0.525 0.549 0.602 0.591 0.535
            0 1  8 2  0.580 0.641 0.681 0.691 0.628 0.648 0.597 0.642
            0 1  8 3  0.581 0.673 0.727 0.715 0.676 0.682 0.599 0.669
            0 1  8 4  0.306 0.278 0.287 0.167 0.274 0.410 0.529 0.272
            0 1  9 1  0.492 0.524 0.572 0.517 0.541 0.596 0.587 0.529
            0 1  9 2  0.577 0.636 0.677 0.690 0.624 0.642 0.594 0.638
            0 1  9 3  0.577 0.670 0.725 0.717 0.674 0.678 0.596 0.667
            0 1  9 4  0.304 0.275 0.282 0.167 0.270 0.404 0.525 0.269
            0 1 10 1  0.490 0.520 0.565 0.510 0.534 0.591 0.585 0.524
            0 1 10 2  0.574 0.633 0.674 0.689 0.621 0.638 0.591 0.636
            0 1 10 3  0.575 0.667 0.724 0.718 0.674 0.675 0.593 0.666
            0 1 10 4  0.303 0.272 0.278 0.166 0.266 0.399 0.522 0.267
            0 1 11 1  0.481 0.502 0.526 0.471 0.498 0.569 0.574 0.498
            0 1 11 2  0.564 0.618 0.664 0.690 0.611 0.621 0.580 0.626
```

0	1	11	3	0.564	0.657	0.724	0.730	0.675	0.662	0.582	0.662
0	1	11	4	0.298	0.261	0.255	0.158	0.245	0.379	0.511	0.253
0	2	1	1	0.841	0.910	0.900	0.790	0.835	0.948	0.907	0.863
0	2	1	2	0.847	0.906	0.939	0.862	0.855	0.837	0.547	0.885
0	2	1	3	0.912	0.948	0.945	0.879	0.907	0.966	0.915	0.923
0	2	1	4	0.065	0.434	0.595	0.087	0.024	0.134	0.144	0.273
0	2	2	1	0.740	0.787	0.791	0.735	0.765	0.838	0.855	0.766
0	2	2	2	0.771	0.794	0.816	0.789	0.788	0.737	0.661	0.790
0	2	2	3	0.820	0.845	0.852	0.820	0.836	0.866	0.863	0.835
0	2	2	4	0.183	0.313	0.389	0.173	0.142	0.243	0.326	0.257
0	2	3	1	0.634	0.700	0.728	0.691	0.708	0.747	0.734	0.689
0	2	3	2	0.652	0.679	0.707	0.703	0.708	0.635	0.586	0.684
0	2	3	3	0.700	0.762	0.788	0.767	0.771	0.778	0.741	0.754
0	2	3	4	0.195	0.250	0.303	0.188	0.194	0.240	0.321	0.233
0	2	4	1	0.574	0.642	0.688	0.663	0.671	0.684	0.663	0.642
0	2	4	2	0.584	0.598	0.633	0.640	0.645	0.561	0.532	0.613
0	2	4	3	0.632	0.705	0.749	0.737	0.731	0.718	0.670	0.704
0	2	4	4	0.188	0.212	0.258	0.182	0.202	0.221	0.301	0.212
0	2	5	1	0.541	0.601	0.658	0.645	0.644	0.640	0.624	0.611
0	2	5	2	0.548	0.544	0.582	0.597	0.596	0.510	0.502	0.567
0	2	5	3	0.596	0.664	0.721	0.720	0.703	0.676	0.631	0.673
0	2	5	4	0.183	0.189	0.230	0.172	0.197	0.204	0.288	0.196
0	2	6	1	0.522	0.573	0.636	0.633	0.623	0.610	0.602	0.590
0	2	6	2	0.527	0.508	0.546	0.568	0.560	0.477	0.484	0.536
0	2	6	3	0.575	0.636	0.701	0.710	0.683	0.647	0.608	0.652
0	2	6	4	0.179	0.174	0.210	0.163	0.189	0.191	0.280	0.184
0	2	7	1	0.511	0.554	0.619	0.624	0.607	0.589	0.588	0.575
0	2	7	2	0.514	0.484	0.520	0.548	0.534	0.454	0.474	0.516
0	2	7	3	0.562	0.616	0.685	0.703	0.668	0.626	0.595	0.638
0	2	7	4	0.176	0.165	0.197	0.156	0.182	0.182	0.274	0.176
0	2	8	1	0.503	0.540	0.606	0.617	0.594	0.575	0.579	0.565
0	2	8	2	0.506	0.467	0.502	0.535	0.515	0.438	0.466	0.501
0	2	8	3	0.553	0.602	0.674	0.699	0.657	0.612	0.585	0.628
0	2	8	4	0.174	0.158	0.187	0.150	0.176	0.176	0.271	0.170
0	2	9	1	0.498	0.530	0.597	0.611	0.585	0.564	0.572	0.557
0	2	9	2	0.500	0.455	0.489	0.525	0.501	0.427	0.461	0.491
0	2	9	3	0.547	0.592	0.666	0.696	0.648	0.601	0.579	0.621
0	2	9	4	0.173	0.153	0.180	0.146	0.171	0.172	0.268	0.166
0	2	10	1	0.494	0.523	0.589	0.607	0.577	0.556	0.568	0.551
0	2	10	2	0.496	0.447	0.480	0.518	0.491	0.419	0.458	0.483
0	2	10	3	0.543	0.584	0.659	0.694	0.642	0.594	0.575	0.615
0	2	10	4	0.172	0.150	0.175	0.143	0.168	0.169	0.267	0.163
0	2	11	1	0.478	0.489	0.551	0.584	0.540	0.519	0.548	0.522
0	2	11	2	0.478	0.407	0.435	0.489	0.443	0.381	0.442	0.449
0	2	11	3	0.525	0.549	0.628	0.687	0.611	0.557	0.555	0.591
0	2	11	4	0.168	0.135	0.151	0.127	0.149	0.153	0.259	0.148
500	1	1	1	0.640	0.773	0.783	0.700	0.742	0.917	0.942	0.728
500	1	1	2	0.894	0.908	0.907	0.880	0.880	0.934	0.944	0.897
500	1	1	3	0.894	0.908	0.907	0.880	0.880	0.935	0.944	0.898
500	1	1	4	0.394	0.340	0.282	0.001	0.226	0.829	0.928	0.286
500	1	2	1	0.604	0.676	0.718	0.625	0.672	0.777	0.774	0.660
500	1	2	2	0.747	0.783	0.812	0.764	0.770	0.810	0.780	0.777
500	1	2	3	0.747	0.786	0.816	0.764	0.774	0.814	0.781	0.779
500	1	2	4	0.349	0.345	0.320	0.053	0.283	0.601	0.727	0.292
500	1	3	1	0.548	0.622	0.683	0.600	0.642	0.713	0.682	0.617
500	1	3	2	0.664	0.725	0.767	0.732	0.722	0.747	0.688	0.720
500	1	3	3	0.664	0.736	0.780	0.733	0.734	0.759	0.690	0.727
500	1	3	4	0.310	0.328	0.328	0.113	0.301	0.520	0.625	0.289
500	1	4	1	0.519	0.585	0.651	0.580	0.615	0.671	0.639	0.587
500	1	4	2	0.624	0.690	0.733	0.715	0.685	0.707	0.645	0.687
500	1	4	3	0.624	0.708	0.755	0.721	0.707	0.726	0.647	0.699

500	1	4	4	0.291	0.310	0.322	0.145	0.302	0.475	0.579	0.283
500	1	5	1	0.503	0.561	0.625	0.562	0.592	0.642	0.617	0.566
500	1	5	2	0.603	0.668	0.710	0.704	0.660	0.682	0.623	0.666
500	1	5	3	0.603	0.691	0.740	0.715	0.691	0.707	0.625	0.684
500	1	5	4	0.281	0.297	0.311	0.160	0.295	0.447	0.556	0.276
500	1	6	1	0.494	0.545	0.605	0.547	0.574	0.624	0.604	0.551
500	1	6	2	0.591	0.654	0.695	0.697	0.644	0.666	0.610	0.654
500	1	6	3	0.591	0.681	0.732	0.714	0.682	0.695	0.612	0.675
500	1	6	4	0.275	0.288	0.301	0.165	0.288	0.430	0.542	0.270
500	1	7	1	0.488	0.534	0.589	0.535	0.560	0.611	0.596	0.539
500	1	7	2	0.584	0.644	0.685	0.693	0.634	0.655	0.602	0.646
500	1	7	3	0.584	0.674	0.727	0.714	0.677	0.687	0.604	0.670
500	1	7	4	0.271	0.281	0.293	0.167	0.280	0.418	0.534	0.265
500	1	8	1	0.484	0.527	0.577	0.525	0.549	0.602	0.591	0.531
500	1	8	2	0.579	0.638	0.679	0.691	0.628	0.648	0.597	0.640
500	1	8	3	0.579	0.670	0.724	0.715	0.675	0.682	0.599	0.667
500	1	8	4	0.269	0.277	0.286	0.167	0.274	0.410	0.529	0.261
500	1	9	1	0.482	0.521	0.568	0.516	0.540	0.595	0.587	0.525
500	1	9	2	0.575	0.634	0.675	0.690	0.624	0.642	0.594	0.637
500	1	9	3	0.576	0.667	0.723	0.717	0.674	0.678	0.596	0.665
500	1	9	4	0.267	0.273	0.281	0.167	0.270	0.404	0.525	0.258
500	1	10	1	0.480	0.517	0.561	0.510	0.533	0.591	0.585	0.520
500	1	10	2	0.573	0.630	0.672	0.689	0.621	0.638	0.591	0.634
500	1	10	3	0.573	0.664	0.722	0.718	0.673	0.675	0.593	0.664
500	1	10	4	0.266	0.271	0.276	0.166	0.266	0.399	0.522	0.256
500	1	11	1	0.472	0.499	0.522	0.471	0.498	0.568	0.574	0.494
500	1	11	2	0.562	0.615	0.662	0.690	0.611	0.621	0.580	0.625
500	1	11	3	0.562	0.653	0.721	0.730	0.674	0.662	0.582	0.660
500	1	11	4	0.261	0.260	0.254	0.158	0.245	0.379	0.511	0.243
500	2	1	1	0.836	0.906	0.899	0.790	0.834	0.947	0.898	0.860
500	2	1	2	0.846	0.904	0.938	0.862	0.854	0.836	0.526	0.884
500	2	1	3	0.908	0.944	0.944	0.879	0.906	0.965	0.907	0.921
500	2	1	4	0.061	0.429	0.591	0.087	0.024	0.134	0.144	0.270
500	2	2	1	0.731	0.784	0.788	0.735	0.764	0.837	0.851	0.762
500	2	2	2	0.769	0.792	0.814	0.787	0.787	0.734	0.650	0.789
500	2	2	3	0.816	0.843	0.850	0.819	0.836	0.864	0.859	0.833
500	2	2	4	0.162	0.307	0.384	0.171	0.142	0.242	0.325	0.248
500	2	3	1	0.626	0.697	0.724	0.690	0.707	0.745	0.731	0.685
500	2	3	2	0.650	0.678	0.704	0.701	0.707	0.633	0.579	0.682
500	2	3	3	0.697	0.760	0.786	0.766	0.771	0.777	0.739	0.752
500	2	3	4	0.172	0.246	0.300	0.186	0.193	0.239	0.320	0.225
500	2	4	1	0.566	0.639	0.684	0.662	0.670	0.683	0.660	0.638
500	2	4	2	0.582	0.597	0.631	0.638	0.644	0.559	0.527	0.611
500	2	4	3	0.629	0.702	0.746	0.736	0.730	0.717	0.667	0.702
500	2	4	4	0.166	0.210	0.256	0.180	0.202	0.220	0.300	0.204
500	2	5	1	0.534	0.598	0.655	0.644	0.643	0.639	0.622	0.607
500	2	5	2	0.546	0.542	0.580	0.596	0.595	0.509	0.497	0.565
500	2	5	3	0.593	0.661	0.718	0.718	0.702	0.674	0.629	0.670
500	2	5	4	0.161	0.187	0.228	0.170	0.196	0.203	0.287	0.188
500	2	6	1	0.515	0.570	0.632	0.631	0.622	0.609	0.600	0.586
500	2	6	2	0.525	0.507	0.544	0.566	0.559	0.475	0.480	0.535
500	2	6	3	0.572	0.633	0.697	0.708	0.682	0.645	0.607	0.650
500	2	6	4	0.157	0.172	0.208	0.161	0.188	0.191	0.279	0.177
500	2	7	1	0.504	0.551	0.615	0.622	0.605	0.588	0.586	0.572
500	2	7	2	0.513	0.483	0.519	0.547	0.533	0.453	0.469	0.514
500	2	7	3	0.559	0.613	0.682	0.702	0.667	0.625	0.593	0.635
500	2	7	4	0.155	0.163	0.195	0.154	0.181	0.182	0.274	0.169
500	2	8	1	0.496	0.537	0.603	0.615	0.593	0.573	0.577	0.561
500	2	8	2	0.504	0.466	0.501	0.533	0.515	0.437	0.462	0.500
500	2	8	3	0.551	0.600	0.671	0.698	0.656	0.611	0.584	0.626
500	2	8	4	0.153	0.156	0.186	0.149	0.175	0.176	0.271	0.164

500	2	9	1	0.491	0.528	0.593	0.610	0.583	0.563	0.571	0.553
500	2	9	2	0.499	0.454	0.488	0.523	0.501	0.426	0.457	0.490
500	2	9	3	0.545	0.589	0.662	0.695	0.647	0.600	0.577	0.618
500	2	9	4	0.152	0.152	0.179	0.145	0.171	0.171	0.268	0.160
500	2	10	1	0.487	0.520	0.585	0.605	0.576	0.555	0.566	0.547
500	2	10	2	0.494	0.446	0.478	0.516	0.490	0.418	0.454	0.482
500	2	10	3	0.541	0.582	0.656	0.693	0.641	0.592	0.573	0.613
500	2	10	4	0.152	0.148	0.174	0.142	0.167	0.168	0.266	0.156
500	2	11	1	0.471	0.487	0.547	0.582	0.539	0.518	0.547	0.519
500	2	11	2	0.476	0.406	0.434	0.487	0.443	0.380	0.438	0.448
500	2	11	3	0.522	0.547	0.624	0.685	0.610	0.556	0.553	0.588
500	2	11	4	0.148	0.133	0.150	0.126	0.149	0.153	0.259	0.142
1000	1	1	1	0.631	0.771	0.783	0.700	0.742	0.917	0.942	0.725
1000	1	1	2	0.891	0.908	0.907	0.880	0.880	0.934	0.944	0.897
1000	1	1	3	0.891	0.908	0.907	0.880	0.880	0.935	0.944	0.897
1000	1	1	4	0.356	0.332	0.282	0.001	0.226	0.829	0.928	0.274
1000	1	2	1	0.590	0.674	0.718	0.624	0.672	0.777	0.774	0.656
1000	1	2	2	0.743	0.783	0.812	0.762	0.770	0.810	0.780	0.775
1000	1	2	3	0.743	0.785	0.816	0.763	0.774	0.814	0.781	0.777
1000	1	2	4	0.295	0.339	0.320	0.053	0.283	0.601	0.727	0.276
1000	1	3	1	0.535	0.619	0.682	0.597	0.642	0.713	0.682	0.612
1000	1	3	2	0.660	0.723	0.767	0.727	0.722	0.747	0.688	0.718
1000	1	3	3	0.661	0.733	0.780	0.729	0.734	0.758	0.690	0.725
1000	1	3	4	0.256	0.324	0.328	0.113	0.301	0.520	0.625	0.274
1000	1	4	1	0.506	0.581	0.651	0.577	0.615	0.671	0.639	0.582
1000	1	4	2	0.621	0.687	0.733	0.709	0.685	0.707	0.645	0.684
1000	1	4	3	0.621	0.704	0.755	0.714	0.707	0.726	0.647	0.697
1000	1	4	4	0.238	0.307	0.322	0.145	0.302	0.475	0.579	0.268
1000	1	5	1	0.490	0.556	0.625	0.559	0.592	0.642	0.617	0.561
1000	1	5	2	0.600	0.664	0.710	0.697	0.660	0.682	0.623	0.664
1000	1	5	3	0.600	0.687	0.740	0.708	0.690	0.707	0.625	0.681
1000	1	5	4	0.229	0.294	0.311	0.160	0.295	0.447	0.556	0.262
1000	1	6	1	0.481	0.540	0.604	0.544	0.573	0.623	0.604	0.546
1000	1	6	2	0.588	0.650	0.695	0.690	0.644	0.666	0.610	0.651
1000	1	6	3	0.588	0.677	0.731	0.706	0.682	0.695	0.612	0.672
1000	1	6	4	0.224	0.285	0.301	0.165	0.288	0.430	0.542	0.256
1000	1	7	1	0.476	0.530	0.589	0.531	0.559	0.610	0.596	0.534
1000	1	7	2	0.581	0.641	0.685	0.686	0.634	0.655	0.602	0.643
1000	1	7	3	0.581	0.670	0.727	0.707	0.677	0.687	0.604	0.667
1000	1	7	4	0.221	0.278	0.293	0.167	0.280	0.418	0.534	0.251
1000	1	8	1	0.472	0.522	0.577	0.521	0.548	0.601	0.591	0.526
1000	1	8	2	0.576	0.634	0.679	0.684	0.628	0.648	0.597	0.638
1000	1	8	3	0.576	0.665	0.724	0.708	0.674	0.681	0.599	0.664
1000	1	8	4	0.218	0.274	0.286	0.167	0.274	0.410	0.529	0.247
1000	1	9	1	0.469	0.517	0.567	0.513	0.539	0.595	0.587	0.519
1000	1	9	2	0.572	0.629	0.675	0.683	0.624	0.642	0.594	0.634
1000	1	9	3	0.572	0.662	0.722	0.709	0.673	0.677	0.596	0.662
1000	1	9	4	0.217	0.271	0.281	0.167	0.270	0.404	0.525	0.244
1000	1	10	1	0.467	0.513	0.560	0.506	0.533	0.590	0.585	0.515
1000	1	10	2	0.570	0.626	0.672	0.682	0.621	0.638	0.591	0.632
1000	1	10	3	0.570	0.659	0.721	0.711	0.672	0.674	0.593	0.661
1000	1	10	4	0.216	0.268	0.276	0.166	0.266	0.399	0.522	0.242
1000	1	11	1	0.459	0.495	0.521	0.467	0.497	0.568	0.573	0.489
1000	1	11	2	0.559	0.611	0.662	0.684	0.611	0.621	0.580	0.622
1000	1	11	3	0.559	0.648	0.720	0.723	0.673	0.661	0.582	0.657
1000	1	11	4	0.211	0.257	0.254	0.158	0.245	0.379	0.511	0.229
1000	2	1	1	0.830	0.899	0.899	0.790	0.833	0.945	0.890	0.857
1000	2	1	2	0.845	0.901	0.938	0.862	0.854	0.831	0.509	0.883
1000	2	1	3	0.904	0.940	0.944	0.879	0.906	0.964	0.899	0.919
1000	2	1	4	0.057	0.410	0.591	0.087	0.024	0.134	0.144	0.265
1000	2	2	1	0.721	0.779	0.788	0.734	0.763	0.835	0.846	0.758

1000	2	2	2	0.766	0.790	0.814	0.786	0.787	0.730	0.638	0.787
1000	2	2	3	0.811	0.840	0.849	0.818	0.836	0.863	0.855	0.831
1000	2	2	4	0.137	0.297	0.384	0.171	0.142	0.240	0.325	0.239
1000	2	3	1	0.617	0.693	0.724	0.689	0.706	0.743	0.728	0.681
1000	2	3	2	0.647	0.676	0.704	0.699	0.707	0.630	0.570	0.681
1000	2	3	3	0.693	0.757	0.785	0.764	0.771	0.775	0.736	0.749
1000	2	3	4	0.144	0.239	0.299	0.185	0.193	0.237	0.320	0.215
1000	2	4	1	0.557	0.635	0.683	0.660	0.670	0.681	0.658	0.634
1000	2	4	2	0.580	0.595	0.631	0.636	0.644	0.557	0.519	0.610
1000	2	4	3	0.626	0.699	0.745	0.733	0.730	0.715	0.665	0.699
1000	2	4	4	0.138	0.204	0.255	0.179	0.202	0.218	0.300	0.195
1000	2	5	1	0.525	0.594	0.654	0.641	0.642	0.637	0.620	0.603
1000	2	5	2	0.544	0.540	0.580	0.593	0.595	0.506	0.490	0.564
1000	2	5	3	0.590	0.658	0.717	0.715	0.702	0.673	0.627	0.668
1000	2	5	4	0.134	0.183	0.227	0.169	0.196	0.201	0.287	0.180
1000	2	6	1	0.507	0.566	0.631	0.629	0.621	0.607	0.598	0.582
1000	2	6	2	0.523	0.505	0.544	0.564	0.559	0.473	0.473	0.533
1000	2	6	3	0.569	0.630	0.696	0.705	0.681	0.644	0.605	0.647
1000	2	6	4	0.131	0.169	0.208	0.161	0.188	0.188	0.279	0.169
1000	2	7	1	0.496	0.547	0.614	0.620	0.604	0.586	0.584	0.568
1000	2	7	2	0.511	0.481	0.519	0.544	0.533	0.451	0.463	0.513
1000	2	7	3	0.556	0.610	0.681	0.698	0.666	0.623	0.591	0.633
1000	2	7	4	0.129	0.159	0.195	0.154	0.181	0.180	0.274	0.161
1000	2	8	1	0.488	0.534	0.601	0.613	0.592	0.571	0.575	0.557
1000	2	8	2	0.502	0.464	0.501	0.530	0.514	0.435	0.456	0.498
1000	2	8	3	0.548	0.596	0.669	0.694	0.655	0.609	0.582	0.623
1000	2	8	4	0.128	0.153	0.185	0.148	0.175	0.174	0.270	0.156
1000	2	9	1	0.483	0.524	0.591	0.607	0.582	0.561	0.569	0.549
1000	2	9	2	0.496	0.452	0.488	0.521	0.501	0.424	0.451	0.488
1000	2	9	3	0.542	0.586	0.661	0.691	0.646	0.598	0.576	0.616
1000	2	9	4	0.127	0.149	0.178	0.144	0.171	0.169	0.268	0.152
1000	2	10	1	0.479	0.517	0.584	0.603	0.575	0.553	0.564	0.543
1000	2	10	2	0.492	0.444	0.478	0.514	0.490	0.416	0.447	0.481
1000	2	10	3	0.538	0.579	0.654	0.689	0.640	0.591	0.571	0.610
1000	2	10	4	0.126	0.145	0.173	0.141	0.167	0.166	0.266	0.149
1000	2	11	1	0.463	0.483	0.545	0.579	0.537	0.516	0.545	0.515
1000	2	11	2	0.474	0.405	0.434	0.485	0.443	0.379	0.432	0.447
1000	2	11	3	0.520	0.544	0.623	0.681	0.608	0.554	0.552	0.586
1000	2	11	4	0.123	0.131	0.149	0.126	0.149	0.151	0.258	0.134
1500	1	1	1	0.621	0.763	0.779	0.700	0.742	0.917	0.942	0.719
1500	1	1	2	0.884	0.906	0.907	0.880	0.880	0.934	0.944	0.894
1500	1	1	3	0.884	0.906	0.907	0.880	0.880	0.935	0.944	0.894
1500	1	1	4	0.334	0.313	0.266	0.001	0.226	0.829	0.928	0.260
1500	1	2	1	0.577	0.663	0.716	0.624	0.672	0.776	0.774	0.650
1500	1	2	2	0.734	0.778	0.812	0.762	0.770	0.810	0.780	0.772
1500	1	2	3	0.734	0.781	0.816	0.763	0.774	0.814	0.781	0.774
1500	1	2	4	0.259	0.325	0.313	0.053	0.283	0.601	0.727	0.261
1500	1	3	1	0.522	0.609	0.680	0.597	0.642	0.713	0.682	0.606
1500	1	3	2	0.653	0.719	0.767	0.727	0.722	0.747	0.688	0.715
1500	1	3	3	0.653	0.729	0.779	0.729	0.734	0.758	0.690	0.722
1500	1	3	4	0.218	0.314	0.324	0.113	0.301	0.520	0.625	0.260
1500	1	4	1	0.493	0.571	0.648	0.577	0.614	0.670	0.639	0.576
1500	1	4	2	0.613	0.683	0.733	0.709	0.685	0.707	0.645	0.682
1500	1	4	3	0.614	0.701	0.755	0.714	0.706	0.726	0.647	0.694
1500	1	4	4	0.200	0.298	0.318	0.145	0.302	0.475	0.579	0.255
1500	1	5	1	0.478	0.547	0.622	0.558	0.591	0.642	0.617	0.555
1500	1	5	2	0.593	0.661	0.710	0.697	0.659	0.682	0.623	0.661
1500	1	5	3	0.593	0.684	0.740	0.708	0.689	0.707	0.625	0.678
1500	1	5	4	0.191	0.286	0.308	0.160	0.295	0.447	0.556	0.249
1500	1	6	1	0.469	0.531	0.602	0.543	0.573	0.623	0.604	0.540
1500	1	6	2	0.581	0.647	0.695	0.690	0.643	0.666	0.610	0.648

1500	1	6	3	0.581	0.673	0.731	0.706	0.680	0.694	0.612	0.669
1500	1	6	4	0.186	0.277	0.298	0.165	0.288	0.430	0.542	0.243
1500	1	7	1	0.463	0.521	0.586	0.531	0.559	0.610	0.596	0.528
1500	1	7	2	0.574	0.637	0.685	0.686	0.633	0.655	0.602	0.640
1500	1	7	3	0.574	0.666	0.726	0.706	0.675	0.686	0.604	0.664
1500	1	7	4	0.183	0.271	0.290	0.167	0.280	0.418	0.534	0.239
1500	1	8	1	0.460	0.513	0.574	0.521	0.547	0.601	0.591	0.520
1500	1	8	2	0.569	0.631	0.679	0.684	0.626	0.648	0.597	0.635
1500	1	8	3	0.569	0.662	0.723	0.708	0.672	0.681	0.599	0.661
1500	1	8	4	0.181	0.267	0.284	0.167	0.274	0.410	0.529	0.235
1500	1	9	1	0.457	0.508	0.564	0.512	0.539	0.594	0.587	0.514
1500	1	9	2	0.566	0.626	0.675	0.683	0.622	0.642	0.594	0.631
1500	1	9	3	0.566	0.658	0.722	0.709	0.671	0.677	0.596	0.659
1500	1	9	4	0.180	0.264	0.278	0.167	0.270	0.404	0.525	0.232
1500	1	10	1	0.455	0.504	0.557	0.505	0.532	0.590	0.585	0.509
1500	1	10	2	0.563	0.623	0.672	0.682	0.619	0.638	0.591	0.629
1500	1	10	3	0.563	0.656	0.721	0.711	0.670	0.674	0.593	0.658
1500	1	10	4	0.179	0.262	0.274	0.166	0.266	0.399	0.522	0.230
1500	1	11	1	0.447	0.486	0.518	0.467	0.496	0.567	0.573	0.483
1500	1	11	2	0.553	0.608	0.662	0.684	0.609	0.621	0.580	0.620
1500	1	11	3	0.553	0.645	0.719	0.722	0.670	0.661	0.582	0.654
1500	1	11	4	0.174	0.251	0.252	0.158	0.245	0.379	0.511	0.217
1500	2	1	1	0.819	0.883	0.897	0.790	0.833	0.941	0.884	0.851
1500	2	1	2	0.840	0.887	0.937	0.862	0.854	0.822	0.503	0.878
1500	2	1	3	0.897	0.925	0.944	0.879	0.906	0.961	0.893	0.914
1500	2	1	4	0.049	0.395	0.583	0.087	0.024	0.134	0.144	0.258
1500	2	2	1	0.710	0.769	0.785	0.734	0.763	0.832	0.843	0.752
1500	2	2	2	0.761	0.783	0.812	0.786	0.786	0.724	0.632	0.783
1500	2	2	3	0.803	0.832	0.848	0.818	0.835	0.861	0.851	0.827
1500	2	2	4	0.115	0.285	0.372	0.171	0.140	0.239	0.324	0.228
1500	2	3	1	0.606	0.685	0.720	0.688	0.706	0.741	0.726	0.676
1500	2	3	2	0.642	0.671	0.703	0.698	0.706	0.625	0.564	0.678
1500	2	3	3	0.687	0.751	0.783	0.764	0.770	0.773	0.734	0.746
1500	2	3	4	0.120	0.231	0.291	0.185	0.192	0.235	0.319	0.205
1500	2	4	1	0.548	0.627	0.680	0.659	0.669	0.679	0.656	0.629
1500	2	4	2	0.575	0.591	0.629	0.636	0.643	0.553	0.514	0.607
1500	2	4	3	0.621	0.694	0.743	0.732	0.729	0.713	0.663	0.696
1500	2	4	4	0.116	0.198	0.248	0.179	0.200	0.216	0.300	0.186
1500	2	5	1	0.517	0.588	0.650	0.641	0.641	0.635	0.618	0.598
1500	2	5	2	0.540	0.538	0.578	0.593	0.594	0.503	0.486	0.562
1500	2	5	3	0.585	0.654	0.714	0.714	0.700	0.671	0.625	0.665
1500	2	5	4	0.112	0.177	0.221	0.169	0.195	0.199	0.287	0.171
1500	2	6	1	0.499	0.560	0.627	0.628	0.620	0.605	0.596	0.578
1500	2	6	2	0.520	0.502	0.542	0.564	0.558	0.470	0.469	0.531
1500	2	6	3	0.564	0.626	0.693	0.704	0.680	0.642	0.603	0.644
1500	2	6	4	0.110	0.163	0.203	0.160	0.187	0.187	0.279	0.161
1500	2	7	1	0.488	0.541	0.610	0.619	0.603	0.584	0.582	0.563
1500	2	7	2	0.507	0.479	0.517	0.544	0.532	0.448	0.459	0.511
1500	2	7	3	0.552	0.606	0.677	0.697	0.664	0.621	0.589	0.630
1500	2	7	4	0.108	0.155	0.190	0.154	0.180	0.178	0.273	0.153
1500	2	8	1	0.480	0.528	0.597	0.611	0.591	0.569	0.573	0.552
1500	2	8	2	0.499	0.462	0.499	0.530	0.513	0.432	0.452	0.496
1500	2	8	3	0.543	0.593	0.666	0.693	0.653	0.607	0.580	0.620
1500	2	8	4	0.107	0.149	0.181	0.148	0.174	0.172	0.270	0.148
1500	2	9	1	0.475	0.518	0.587	0.606	0.581	0.559	0.567	0.545
1500	2	9	2	0.493	0.450	0.486	0.521	0.499	0.421	0.447	0.486
1500	2	9	3	0.538	0.583	0.657	0.690	0.644	0.597	0.574	0.612
1500	2	9	4	0.106	0.144	0.174	0.144	0.170	0.168	0.267	0.144
1500	2	10	1	0.472	0.511	0.579	0.602	0.574	0.551	0.563	0.539
1500	2	10	2	0.489	0.442	0.477	0.514	0.489	0.413	0.444	0.479
1500	2	10	3	0.533	0.575	0.651	0.688	0.638	0.589	0.570	0.607

1500	2	10	4	0.106	0.141	0.169	0.141	0.166	0.164	0.266	0.141
1500	2	11	1	0.456	0.478	0.540	0.578	0.536	0.514	0.543	0.510
1500	2	11	2	0.471	0.403	0.432	0.485	0.442	0.376	0.428	0.445
1500	2	11	3	0.515	0.541	0.618	0.680	0.606	0.553	0.550	0.582
1500	2	11	4	0.103	0.127	0.146	0.126	0.148	0.150	0.258	0.127
2000	1	1	1	0.613	0.760	0.779	0.700	0.742	0.917	0.942	0.717
2000	1	1	2	0.882	0.891	0.907	0.879	0.880	0.934	0.944	0.891
2000	1	1	3	0.882	0.891	0.907	0.879	0.880	0.935	0.944	0.891
2000	1	1	4	0.303	0.310	0.266	0.001	0.226	0.829	0.928	0.251
2000	1	2	1	0.567	0.656	0.716	0.621	0.672	0.776	0.774	0.645
2000	1	2	2	0.732	0.772	0.812	0.759	0.770	0.810	0.780	0.770
2000	1	2	3	0.732	0.774	0.816	0.759	0.774	0.813	0.781	0.772
2000	1	2	4	0.222	0.323	0.313	0.053	0.283	0.601	0.727	0.251
2000	1	3	1	0.512	0.601	0.679	0.592	0.642	0.713	0.682	0.601
2000	1	3	2	0.651	0.715	0.767	0.719	0.722	0.746	0.688	0.712
2000	1	3	3	0.651	0.725	0.779	0.721	0.733	0.757	0.690	0.719
2000	1	3	4	0.181	0.311	0.324	0.113	0.301	0.520	0.625	0.250
2000	1	4	1	0.484	0.564	0.646	0.570	0.614	0.670	0.639	0.570
2000	1	4	2	0.612	0.680	0.733	0.699	0.685	0.706	0.645	0.679
2000	1	4	3	0.612	0.697	0.754	0.704	0.706	0.725	0.647	0.691
2000	1	4	4	0.164	0.296	0.318	0.145	0.302	0.475	0.579	0.245
2000	1	5	1	0.469	0.540	0.620	0.551	0.591	0.641	0.617	0.549
2000	1	5	2	0.591	0.658	0.710	0.686	0.659	0.681	0.623	0.658
2000	1	5	3	0.591	0.680	0.739	0.697	0.689	0.705	0.625	0.675
2000	1	5	4	0.155	0.284	0.308	0.160	0.295	0.447	0.556	0.239
2000	1	6	1	0.460	0.524	0.600	0.536	0.572	0.622	0.604	0.534
2000	1	6	2	0.580	0.644	0.695	0.679	0.643	0.665	0.610	0.645
2000	1	6	3	0.580	0.670	0.730	0.695	0.679	0.693	0.612	0.666
2000	1	6	4	0.150	0.276	0.298	0.165	0.288	0.430	0.542	0.233
2000	1	7	1	0.454	0.514	0.584	0.523	0.558	0.610	0.596	0.523
2000	1	7	2	0.572	0.635	0.685	0.675	0.633	0.654	0.602	0.637
2000	1	7	3	0.572	0.663	0.725	0.695	0.674	0.685	0.604	0.661
2000	1	7	4	0.147	0.270	0.290	0.167	0.280	0.418	0.534	0.229
2000	1	8	1	0.451	0.507	0.572	0.513	0.547	0.601	0.591	0.514
2000	1	8	2	0.568	0.629	0.679	0.673	0.626	0.647	0.597	0.632
2000	1	8	3	0.568	0.659	0.722	0.696	0.672	0.680	0.599	0.658
2000	1	8	4	0.145	0.266	0.284	0.167	0.274	0.410	0.529	0.225
2000	1	9	1	0.448	0.501	0.562	0.505	0.538	0.594	0.587	0.508
2000	1	9	2	0.564	0.624	0.675	0.672	0.622	0.642	0.594	0.629
2000	1	9	3	0.564	0.655	0.721	0.698	0.670	0.676	0.596	0.656
2000	1	9	4	0.144	0.263	0.278	0.167	0.270	0.404	0.525	0.222
2000	1	10	1	0.446	0.498	0.555	0.498	0.531	0.589	0.585	0.503
2000	1	10	2	0.562	0.621	0.672	0.671	0.619	0.638	0.591	0.626
2000	1	10	3	0.562	0.653	0.720	0.699	0.669	0.673	0.593	0.654
2000	1	10	4	0.143	0.261	0.274	0.166	0.266	0.399	0.522	0.220
2000	1	11	1	0.438	0.480	0.516	0.460	0.495	0.567	0.573	0.478
2000	1	11	2	0.551	0.606	0.662	0.674	0.609	0.620	0.580	0.617
2000	1	11	3	0.551	0.642	0.719	0.712	0.670	0.659	0.582	0.651
2000	1	11	4	0.139	0.250	0.252	0.158	0.245	0.379	0.511	0.207
2000	2	1	1	0.813	0.878	0.897	0.783	0.832	0.940	0.878	0.847
2000	2	1	2	0.840	0.885	0.937	0.855	0.854	0.822	0.498	0.877
2000	2	1	3	0.893	0.920	0.944	0.872	0.905	0.960	0.887	0.910
2000	2	1	4	0.046	0.391	0.583	0.086	0.023	0.133	0.143	0.257
2000	2	2	1	0.700	0.764	0.785	0.730	0.762	0.831	0.839	0.747
2000	2	2	2	0.758	0.780	0.812	0.781	0.785	0.723	0.627	0.781
2000	2	2	3	0.799	0.827	0.848	0.813	0.834	0.860	0.848	0.824
2000	2	2	4	0.094	0.280	0.372	0.169	0.140	0.236	0.322	0.221
2000	2	3	1	0.597	0.679	0.719	0.684	0.705	0.740	0.723	0.671
2000	2	3	2	0.639	0.669	0.703	0.693	0.705	0.624	0.561	0.675
2000	2	3	3	0.683	0.747	0.782	0.758	0.769	0.772	0.731	0.743
2000	2	3	4	0.097	0.227	0.291	0.184	0.191	0.233	0.317	0.197

2000	2	4	1	0.539	0.621	0.678	0.654	0.668	0.677	0.654	0.624
2000	2	4	2	0.573	0.589	0.629	0.630	0.642	0.551	0.512	0.605
2000	2	4	3	0.617	0.690	0.742	0.726	0.728	0.711	0.661	0.693
2000	2	4	4	0.093	0.195	0.248	0.178	0.199	0.214	0.298	0.179
2000	2	5	1	0.509	0.582	0.648	0.636	0.640	0.633	0.616	0.594
2000	2	5	2	0.537	0.536	0.578	0.587	0.593	0.502	0.483	0.559
2000	2	5	3	0.581	0.650	0.713	0.708	0.699	0.669	0.623	0.661
2000	2	5	4	0.090	0.174	0.221	0.168	0.194	0.197	0.285	0.164
2000	2	6	1	0.491	0.554	0.625	0.623	0.618	0.603	0.594	0.573
2000	2	6	2	0.517	0.501	0.542	0.558	0.557	0.469	0.467	0.529
2000	2	6	3	0.561	0.622	0.692	0.698	0.678	0.640	0.602	0.641
2000	2	6	4	0.089	0.161	0.203	0.160	0.186	0.185	0.277	0.154
2000	2	7	1	0.480	0.536	0.608	0.614	0.602	0.582	0.581	0.558
2000	2	7	2	0.504	0.477	0.517	0.539	0.531	0.447	0.457	0.509
2000	2	7	3	0.548	0.603	0.676	0.691	0.663	0.620	0.588	0.626
2000	2	7	4	0.087	0.153	0.190	0.153	0.179	0.176	0.272	0.147
2000	2	8	1	0.473	0.522	0.595	0.607	0.589	0.568	0.572	0.548
2000	2	8	2	0.496	0.460	0.499	0.525	0.512	0.431	0.450	0.494
2000	2	8	3	0.540	0.589	0.664	0.687	0.652	0.605	0.579	0.616
2000	2	8	4	0.086	0.147	0.181	0.148	0.173	0.170	0.268	0.142
2000	2	9	1	0.468	0.513	0.585	0.601	0.580	0.557	0.566	0.540
2000	2	9	2	0.490	0.449	0.486	0.516	0.499	0.420	0.445	0.484
2000	2	9	3	0.534	0.579	0.656	0.684	0.643	0.595	0.573	0.609
2000	2	9	4	0.086	0.142	0.174	0.144	0.169	0.166	0.266	0.138
2000	2	10	1	0.464	0.506	0.577	0.597	0.572	0.549	0.561	0.534
2000	2	10	2	0.486	0.440	0.477	0.509	0.488	0.412	0.441	0.477
2000	2	10	3	0.530	0.571	0.649	0.682	0.636	0.587	0.568	0.604
2000	2	10	4	0.085	0.139	0.169	0.140	0.165	0.163	0.264	0.135
2000	2	11	1	0.448	0.473	0.538	0.573	0.535	0.513	0.542	0.506
2000	2	11	2	0.468	0.401	0.432	0.480	0.441	0.375	0.427	0.443
2000	2	11	3	0.512	0.537	0.617	0.674	0.605	0.551	0.549	0.579
2000	2	11	4	0.083	0.125	0.146	0.125	0.147	0.148	0.256	0.121
2500	1	1	1	0.607	0.752	0.776	0.700	0.742	0.917	0.942	0.713
2500	1	1	2	0.873	0.883	0.907	0.879	0.880	0.934	0.944	0.887
2500	1	1	3	0.873	0.883	0.907	0.879	0.880	0.935	0.944	0.887
2500	1	1	4	0.292	0.287	0.257	0.001	0.226	0.829	0.928	0.241
2500	1	2	1	0.561	0.650	0.713	0.621	0.672	0.776	0.774	0.642
2500	1	2	2	0.717	0.769	0.812	0.758	0.770	0.810	0.780	0.765
2500	1	2	3	0.717	0.771	0.816	0.758	0.774	0.813	0.781	0.767
2500	1	2	4	0.213	0.306	0.310	0.053	0.283	0.601	0.727	0.244
2500	1	3	1	0.507	0.596	0.674	0.592	0.641	0.713	0.682	0.597
2500	1	3	2	0.635	0.713	0.766	0.717	0.722	0.746	0.688	0.707
2500	1	3	3	0.636	0.723	0.778	0.718	0.733	0.757	0.690	0.714
2500	1	3	4	0.173	0.299	0.321	0.113	0.301	0.520	0.625	0.244
2500	1	4	1	0.479	0.560	0.640	0.570	0.614	0.670	0.639	0.567
2500	1	4	2	0.597	0.678	0.732	0.695	0.685	0.705	0.645	0.673
2500	1	4	3	0.597	0.695	0.753	0.700	0.705	0.724	0.647	0.685
2500	1	4	4	0.156	0.286	0.316	0.145	0.302	0.475	0.579	0.240
2500	1	5	1	0.464	0.536	0.613	0.551	0.590	0.641	0.617	0.545
2500	1	5	2	0.577	0.656	0.708	0.682	0.659	0.680	0.623	0.653
2500	1	5	3	0.577	0.678	0.737	0.693	0.688	0.704	0.625	0.669
2500	1	5	4	0.148	0.275	0.307	0.160	0.295	0.447	0.556	0.235
2500	1	6	1	0.455	0.521	0.592	0.536	0.572	0.622	0.604	0.530
2500	1	6	2	0.565	0.643	0.693	0.675	0.643	0.663	0.610	0.640
2500	1	6	3	0.565	0.668	0.728	0.690	0.679	0.691	0.612	0.660
2500	1	6	4	0.143	0.267	0.297	0.165	0.288	0.430	0.542	0.229
2500	1	7	1	0.450	0.510	0.577	0.523	0.557	0.609	0.596	0.519
2500	1	7	2	0.558	0.634	0.683	0.671	0.633	0.652	0.602	0.632
2500	1	7	3	0.558	0.661	0.723	0.690	0.674	0.683	0.604	0.655
2500	1	7	4	0.140	0.262	0.289	0.167	0.280	0.418	0.534	0.225
2500	1	8	1	0.446	0.503	0.564	0.513	0.546	0.600	0.591	0.510

2500	1	8	2	0.553	0.627	0.677	0.668	0.626	0.645	0.597	0.627
2500	1	8	3	0.553	0.657	0.720	0.691	0.671	0.677	0.599	0.652
2500	1	8	4	0.138	0.258	0.282	0.167	0.274	0.410	0.529	0.221
2500	1	9	1	0.443	0.498	0.555	0.505	0.538	0.594	0.587	0.504
2500	1	9	2	0.550	0.623	0.673	0.667	0.622	0.639	0.594	0.623
2500	1	9	3	0.550	0.654	0.718	0.693	0.669	0.673	0.596	0.650
2500	1	9	4	0.137	0.255	0.277	0.167	0.270	0.404	0.525	0.218
2500	1	10	1	0.442	0.494	0.548	0.498	0.531	0.589	0.585	0.499
2500	1	10	2	0.548	0.620	0.670	0.667	0.619	0.635	0.591	0.621
2500	1	10	3	0.548	0.651	0.717	0.694	0.669	0.670	0.593	0.649
2500	1	10	4	0.136	0.253	0.273	0.166	0.266	0.399	0.522	0.216
2500	1	11	1	0.434	0.477	0.509	0.459	0.494	0.566	0.573	0.474
2500	1	11	2	0.537	0.605	0.660	0.669	0.609	0.617	0.580	0.612
2500	1	11	3	0.537	0.640	0.716	0.707	0.669	0.656	0.582	0.645
2500	1	11	4	0.132	0.243	0.251	0.158	0.245	0.379	0.511	0.204
2500	2	1	1	0.797	0.873	0.896	0.781	0.831	0.937	0.869	0.840
2500	2	1	2	0.829	0.881	0.936	0.853	0.854	0.815	0.483	0.872
2500	2	1	3	0.879	0.916	0.943	0.870	0.905	0.959	0.878	0.905
2500	2	1	4	0.039	0.371	0.578	0.083	0.023	0.133	0.142	0.249
2500	2	2	1	0.687	0.759	0.783	0.727	0.761	0.829	0.833	0.742
2500	2	2	2	0.746	0.778	0.811	0.778	0.782	0.719	0.614	0.776
2500	2	2	3	0.784	0.824	0.847	0.810	0.833	0.858	0.842	0.818
2500	2	2	4	0.081	0.268	0.366	0.167	0.138	0.234	0.320	0.213
2500	2	3	1	0.587	0.675	0.716	0.681	0.703	0.737	0.719	0.666
2500	2	3	2	0.628	0.668	0.701	0.690	0.701	0.621	0.551	0.671
2500	2	3	3	0.670	0.744	0.781	0.755	0.768	0.770	0.727	0.737
2500	2	3	4	0.086	0.218	0.286	0.182	0.188	0.230	0.316	0.191
2500	2	4	1	0.530	0.618	0.673	0.652	0.666	0.675	0.650	0.619
2500	2	4	2	0.562	0.588	0.627	0.627	0.638	0.548	0.503	0.601
2500	2	4	3	0.605	0.687	0.739	0.723	0.726	0.709	0.658	0.687
2500	2	4	4	0.083	0.188	0.245	0.177	0.197	0.211	0.296	0.173
2500	2	5	1	0.500	0.578	0.642	0.634	0.638	0.631	0.613	0.588
2500	2	5	2	0.527	0.535	0.575	0.584	0.590	0.499	0.475	0.555
2500	2	5	3	0.570	0.647	0.709	0.705	0.698	0.667	0.621	0.656
2500	2	5	4	0.081	0.169	0.218	0.167	0.192	0.194	0.284	0.159
2500	2	6	1	0.483	0.551	0.618	0.621	0.617	0.601	0.592	0.568
2500	2	6	2	0.507	0.500	0.539	0.555	0.554	0.466	0.459	0.525
2500	2	6	3	0.550	0.620	0.687	0.694	0.677	0.637	0.599	0.635
2500	2	6	4	0.079	0.156	0.200	0.159	0.185	0.182	0.276	0.150
2500	2	7	1	0.472	0.532	0.601	0.612	0.600	0.580	0.578	0.553
2500	2	7	2	0.495	0.476	0.513	0.536	0.529	0.444	0.449	0.504
2500	2	7	3	0.538	0.600	0.670	0.687	0.661	0.617	0.585	0.621
2500	2	7	4	0.078	0.148	0.187	0.152	0.178	0.174	0.271	0.143
2500	2	8	1	0.465	0.519	0.587	0.604	0.588	0.566	0.569	0.543
2500	2	8	2	0.487	0.460	0.495	0.522	0.510	0.428	0.443	0.490
2500	2	8	3	0.530	0.586	0.659	0.683	0.650	0.603	0.576	0.611
2500	2	8	4	0.078	0.142	0.178	0.147	0.172	0.168	0.267	0.137
2500	2	9	1	0.460	0.510	0.577	0.599	0.578	0.555	0.563	0.535
2500	2	9	2	0.481	0.448	0.482	0.513	0.496	0.417	0.438	0.480
2500	2	9	3	0.524	0.576	0.650	0.680	0.641	0.592	0.570	0.604
2500	2	9	4	0.077	0.138	0.172	0.143	0.167	0.164	0.265	0.134
2500	2	10	1	0.457	0.503	0.569	0.595	0.570	0.547	0.559	0.529
2500	2	10	2	0.477	0.439	0.472	0.506	0.486	0.409	0.435	0.472
2500	2	10	3	0.520	0.569	0.643	0.678	0.635	0.584	0.566	0.598
2500	2	10	4	0.077	0.135	0.167	0.140	0.164	0.161	0.263	0.131
2500	2	11	1	0.441	0.470	0.530	0.571	0.533	0.511	0.540	0.500
2500	2	11	2	0.460	0.401	0.428	0.478	0.439	0.373	0.420	0.439
2500	2	11	3	0.502	0.535	0.610	0.670	0.603	0.548	0.546	0.574
2500	2	11	4	0.075	0.122	0.144	0.125	0.146	0.146	0.255	0.118
3000	1	1	1	0.582	0.745	0.776	0.700	0.742	0.917	0.942	0.705
3000	1	1	2	0.856	0.881	0.907	0.879	0.880	0.934	0.944	0.882

3000	1	1	3	0.856	0.881	0.907	0.879	0.880	0.935	0.944	0.882
3000	1	1	4	0.278	0.260	0.257	0.001	0.226	0.829	0.928	0.231
3000	1	2	1	0.542	0.645	0.712	0.618	0.672	0.776	0.774	0.635
3000	1	2	2	0.694	0.768	0.812	0.754	0.770	0.809	0.779	0.758
3000	1	2	3	0.694	0.770	0.816	0.754	0.774	0.812	0.780	0.759
3000	1	2	4	0.201	0.289	0.308	0.053	0.283	0.601	0.727	0.237
3000	1	3	1	0.491	0.593	0.671	0.585	0.641	0.711	0.682	0.590
3000	1	3	2	0.614	0.712	0.765	0.705	0.722	0.744	0.688	0.699
3000	1	3	3	0.614	0.722	0.777	0.706	0.733	0.755	0.690	0.705
3000	1	3	4	0.164	0.286	0.320	0.113	0.301	0.520	0.625	0.239
3000	1	4	1	0.464	0.557	0.636	0.561	0.613	0.668	0.639	0.559
3000	1	4	2	0.577	0.677	0.730	0.679	0.685	0.703	0.645	0.665
3000	1	4	3	0.577	0.694	0.751	0.685	0.705	0.721	0.647	0.676
3000	1	4	4	0.148	0.275	0.315	0.145	0.302	0.475	0.579	0.235
3000	1	5	1	0.450	0.533	0.608	0.542	0.590	0.639	0.617	0.538
3000	1	5	2	0.557	0.656	0.707	0.665	0.659	0.677	0.623	0.644
3000	1	5	3	0.557	0.677	0.735	0.675	0.688	0.701	0.625	0.660
3000	1	5	4	0.140	0.266	0.305	0.160	0.295	0.447	0.556	0.230
3000	1	6	1	0.442	0.518	0.587	0.527	0.571	0.620	0.604	0.523
3000	1	6	2	0.546	0.642	0.691	0.657	0.643	0.661	0.610	0.631
3000	1	6	3	0.546	0.667	0.726	0.672	0.678	0.688	0.612	0.651
3000	1	6	4	0.135	0.258	0.296	0.165	0.288	0.430	0.542	0.225
3000	1	7	1	0.436	0.508	0.571	0.514	0.557	0.607	0.596	0.512
3000	1	7	2	0.539	0.633	0.682	0.653	0.633	0.650	0.602	0.623
3000	1	7	3	0.539	0.660	0.721	0.672	0.673	0.680	0.604	0.646
3000	1	7	4	0.133	0.253	0.288	0.167	0.280	0.418	0.534	0.221
3000	1	8	1	0.433	0.500	0.559	0.504	0.546	0.598	0.591	0.503
3000	1	8	2	0.534	0.627	0.676	0.651	0.626	0.642	0.597	0.618
3000	1	8	3	0.534	0.656	0.718	0.673	0.670	0.674	0.599	0.643
3000	1	8	4	0.131	0.250	0.281	0.167	0.274	0.410	0.529	0.217
3000	1	9	1	0.431	0.495	0.549	0.495	0.537	0.591	0.587	0.497
3000	1	9	2	0.531	0.622	0.671	0.650	0.622	0.637	0.593	0.615
3000	1	9	3	0.531	0.652	0.716	0.675	0.669	0.670	0.595	0.641
3000	1	9	4	0.130	0.247	0.276	0.167	0.270	0.404	0.525	0.214
3000	1	10	1	0.429	0.491	0.542	0.489	0.530	0.586	0.585	0.492
3000	1	10	2	0.529	0.619	0.669	0.649	0.619	0.633	0.591	0.612
3000	1	10	3	0.529	0.650	0.715	0.676	0.668	0.667	0.593	0.639
3000	1	10	4	0.129	0.245	0.272	0.166	0.266	0.399	0.522	0.212
3000	1	11	1	0.421	0.474	0.503	0.451	0.494	0.564	0.573	0.467
3000	1	11	2	0.519	0.604	0.659	0.653	0.609	0.615	0.579	0.603
3000	1	11	3	0.519	0.639	0.713	0.690	0.668	0.653	0.581	0.636
3000	1	11	4	0.125	0.236	0.249	0.158	0.245	0.379	0.511	0.200
3000	2	1	1	0.788	0.869	0.894	0.781	0.831	0.933	0.854	0.837
3000	2	1	2	0.828	0.880	0.935	0.853	0.854	0.809	0.440	0.871
3000	2	1	3	0.874	0.914	0.942	0.870	0.904	0.955	0.863	0.903
3000	2	1	4	0.037	0.367	0.569	0.083	0.023	0.132	0.141	0.245
3000	2	2	1	0.673	0.755	0.780	0.727	0.759	0.825	0.826	0.736
3000	2	2	2	0.733	0.777	0.809	0.777	0.781	0.713	0.594	0.772
3000	2	2	3	0.770	0.822	0.845	0.810	0.832	0.855	0.835	0.813
3000	2	2	4	0.075	0.260	0.360	0.167	0.136	0.230	0.317	0.208
3000	2	3	1	0.572	0.672	0.712	0.679	0.702	0.734	0.715	0.660
3000	2	3	2	0.613	0.667	0.700	0.687	0.700	0.615	0.538	0.665
3000	2	3	3	0.654	0.742	0.778	0.752	0.767	0.766	0.723	0.731
3000	2	3	4	0.079	0.211	0.282	0.182	0.186	0.226	0.312	0.186
3000	2	4	1	0.517	0.614	0.669	0.649	0.665	0.671	0.647	0.613
3000	2	4	2	0.548	0.587	0.625	0.623	0.637	0.543	0.492	0.595
3000	2	4	3	0.590	0.685	0.736	0.718	0.725	0.705	0.654	0.681
3000	2	4	4	0.077	0.182	0.241	0.177	0.195	0.207	0.293	0.169
3000	2	5	1	0.487	0.575	0.638	0.630	0.637	0.628	0.610	0.582
3000	2	5	2	0.513	0.534	0.573	0.579	0.588	0.494	0.466	0.549
3000	2	5	3	0.555	0.645	0.706	0.698	0.696	0.663	0.617	0.649

3000	2	5	4	0.075	0.164	0.215	0.167	0.191	0.191	0.280	0.156
3000	2	6	1	0.470	0.548	0.614	0.617	0.615	0.598	0.588	0.562
3000	2	6	2	0.493	0.499	0.537	0.550	0.553	0.461	0.450	0.519
3000	2	6	3	0.536	0.617	0.684	0.687	0.675	0.634	0.596	0.629
3000	2	6	4	0.073	0.152	0.198	0.159	0.183	0.179	0.273	0.146
3000	2	7	1	0.460	0.529	0.596	0.608	0.599	0.577	0.575	0.547
3000	2	7	2	0.481	0.476	0.512	0.530	0.527	0.439	0.441	0.499
3000	2	7	3	0.523	0.598	0.667	0.681	0.660	0.614	0.582	0.614
3000	2	7	4	0.073	0.143	0.185	0.152	0.176	0.171	0.267	0.139
3000	2	8	1	0.453	0.516	0.583	0.600	0.586	0.563	0.566	0.537
3000	2	8	2	0.473	0.459	0.494	0.517	0.509	0.424	0.434	0.485
3000	2	8	3	0.515	0.584	0.655	0.676	0.648	0.600	0.573	0.604
3000	2	8	4	0.072	0.138	0.176	0.147	0.171	0.166	0.264	0.134
3000	2	9	1	0.448	0.507	0.572	0.595	0.576	0.552	0.560	0.529
3000	2	9	2	0.468	0.448	0.480	0.508	0.495	0.413	0.430	0.474
3000	2	9	3	0.510	0.574	0.646	0.673	0.640	0.589	0.567	0.597
3000	2	9	4	0.071	0.134	0.170	0.143	0.166	0.161	0.262	0.131
3000	2	10	1	0.445	0.500	0.565	0.591	0.569	0.544	0.556	0.523
3000	2	10	2	0.464	0.439	0.471	0.501	0.485	0.405	0.427	0.467
3000	2	10	3	0.506	0.567	0.639	0.671	0.633	0.581	0.563	0.592
3000	2	10	4	0.071	0.131	0.165	0.140	0.163	0.158	0.260	0.128
3000	2	11	1	0.430	0.467	0.526	0.567	0.531	0.508	0.537	0.495
3000	2	11	2	0.446	0.401	0.426	0.473	0.438	0.369	0.412	0.434
3000	2	11	3	0.489	0.533	0.606	0.664	0.601	0.545	0.544	0.567
3000	2	11	4	0.070	0.118	0.142	0.125	0.145	0.144	0.252	0.115
3500	1	1	1	0.503	0.738	0.775	0.700	0.742	0.917	0.942	0.682
3500	1	1	2	0.773	0.877	0.907	0.879	0.880	0.934	0.944	0.858
3500	1	1	3	0.773	0.877	0.907	0.879	0.880	0.935	0.944	0.858
3500	1	1	4	0.252	0.232	0.254	0.001	0.226	0.829	0.928	0.218
3500	1	2	1	0.440	0.640	0.711	0.617	0.672	0.776	0.774	0.605
3500	1	2	2	0.581	0.763	0.812	0.752	0.770	0.809	0.779	0.725
3500	1	2	3	0.581	0.765	0.816	0.752	0.774	0.812	0.780	0.727
3500	1	2	4	0.184	0.274	0.305	0.053	0.283	0.601	0.727	0.228
3500	1	3	1	0.389	0.587	0.670	0.583	0.641	0.711	0.682	0.561
3500	1	3	2	0.500	0.707	0.765	0.701	0.722	0.744	0.688	0.666
3500	1	3	3	0.500	0.716	0.777	0.703	0.733	0.755	0.689	0.672
3500	1	3	4	0.150	0.276	0.317	0.113	0.301	0.520	0.625	0.232
3500	1	4	1	0.365	0.551	0.634	0.559	0.613	0.668	0.639	0.530
3500	1	4	2	0.464	0.672	0.730	0.675	0.685	0.703	0.645	0.632
3500	1	4	3	0.464	0.688	0.751	0.680	0.705	0.721	0.647	0.643
3500	1	4	4	0.135	0.266	0.313	0.145	0.302	0.475	0.579	0.230
3500	1	5	1	0.352	0.527	0.606	0.540	0.590	0.639	0.617	0.509
3500	1	5	2	0.446	0.651	0.707	0.661	0.659	0.677	0.623	0.612
3500	1	5	3	0.446	0.672	0.735	0.671	0.687	0.701	0.624	0.628
3500	1	5	4	0.128	0.258	0.304	0.160	0.295	0.447	0.556	0.225
3500	1	6	1	0.344	0.512	0.585	0.524	0.571	0.620	0.604	0.494
3500	1	6	2	0.435	0.637	0.691	0.653	0.643	0.661	0.610	0.599
3500	1	6	3	0.435	0.661	0.725	0.667	0.678	0.688	0.612	0.619
3500	1	6	4	0.124	0.251	0.294	0.165	0.288	0.430	0.542	0.220
3500	1	7	1	0.340	0.502	0.569	0.512	0.556	0.607	0.596	0.483
3500	1	7	2	0.429	0.628	0.682	0.648	0.633	0.650	0.602	0.591
3500	1	7	3	0.429	0.654	0.720	0.667	0.672	0.680	0.604	0.614
3500	1	7	4	0.121	0.246	0.286	0.167	0.280	0.418	0.534	0.216
3500	1	8	1	0.337	0.495	0.556	0.501	0.545	0.597	0.591	0.475
3500	1	8	2	0.425	0.622	0.676	0.646	0.626	0.642	0.597	0.586
3500	1	8	3	0.425	0.650	0.717	0.668	0.670	0.674	0.599	0.611
3500	1	8	4	0.120	0.243	0.280	0.167	0.274	0.410	0.529	0.213
3500	1	9	1	0.335	0.489	0.547	0.493	0.536	0.591	0.587	0.468
3500	1	9	2	0.422	0.617	0.671	0.645	0.622	0.637	0.593	0.583
3500	1	9	3	0.422	0.647	0.715	0.670	0.668	0.670	0.595	0.609
3500	1	9	4	0.119	0.241	0.275	0.167	0.270	0.404	0.525	0.210

3500	1	10	1	0.333	0.486	0.539	0.487	0.529	0.586	0.585	0.464
3500	1	10	2	0.420	0.614	0.669	0.645	0.619	0.633	0.591	0.581
3500	1	10	3	0.420	0.644	0.714	0.671	0.667	0.667	0.592	0.607
3500	1	10	4	0.118	0.239	0.271	0.166	0.266	0.399	0.522	0.208
3500	1	11	1	0.326	0.468	0.500	0.449	0.493	0.563	0.573	0.439
3500	1	11	2	0.411	0.599	0.659	0.649	0.609	0.615	0.579	0.572
3500	1	11	3	0.411	0.633	0.712	0.685	0.667	0.653	0.581	0.604
3500	1	11	4	0.114	0.230	0.248	0.158	0.245	0.379	0.511	0.196
3500	2	1	1	0.778	0.862	0.893	0.780	0.830	0.931	0.839	0.832
3500	2	1	2	0.823	0.874	0.935	0.852	0.854	0.808	0.403	0.868
3500	2	1	3	0.866	0.909	0.941	0.870	0.904	0.954	0.847	0.899
3500	2	1	4	0.036	0.334	0.566	0.081	0.023	0.132	0.138	0.237
3500	2	2	1	0.633	0.750	0.779	0.726	0.758	0.823	0.817	0.723
3500	2	2	2	0.693	0.773	0.809	0.777	0.778	0.710	0.568	0.759
3500	2	2	3	0.727	0.818	0.844	0.809	0.831	0.853	0.825	0.800
3500	2	2	4	0.067	0.243	0.354	0.165	0.134	0.230	0.312	0.200
3500	2	3	1	0.527	0.666	0.710	0.678	0.700	0.732	0.708	0.645
3500	2	3	2	0.565	0.663	0.699	0.686	0.697	0.612	0.520	0.651
3500	2	3	3	0.604	0.738	0.777	0.750	0.765	0.764	0.716	0.716
3500	2	3	4	0.071	0.200	0.277	0.181	0.183	0.225	0.308	0.180
3500	2	4	1	0.472	0.609	0.666	0.647	0.663	0.669	0.641	0.598
3500	2	4	2	0.499	0.584	0.624	0.621	0.634	0.540	0.477	0.580
3500	2	4	3	0.540	0.681	0.734	0.715	0.724	0.704	0.649	0.665
3500	2	4	4	0.069	0.174	0.238	0.176	0.192	0.206	0.289	0.164
3500	2	5	1	0.443	0.570	0.634	0.628	0.635	0.626	0.605	0.568
3500	2	5	2	0.465	0.531	0.572	0.578	0.586	0.491	0.452	0.535
3500	2	5	3	0.506	0.641	0.703	0.696	0.695	0.661	0.612	0.634
3500	2	5	4	0.067	0.157	0.212	0.166	0.188	0.190	0.276	0.151
3500	2	6	1	0.427	0.543	0.610	0.615	0.613	0.596	0.584	0.547
3500	2	6	2	0.446	0.496	0.536	0.548	0.550	0.458	0.438	0.505
3500	2	6	3	0.487	0.613	0.680	0.685	0.674	0.632	0.591	0.613
3500	2	6	4	0.066	0.145	0.195	0.158	0.180	0.178	0.269	0.142
3500	2	7	1	0.417	0.524	0.592	0.606	0.597	0.575	0.571	0.533
3500	2	7	2	0.434	0.473	0.510	0.529	0.525	0.437	0.428	0.485
3500	2	7	3	0.476	0.594	0.664	0.678	0.658	0.612	0.578	0.599
3500	2	7	4	0.065	0.138	0.183	0.151	0.174	0.170	0.264	0.135
3500	2	8	1	0.410	0.511	0.579	0.598	0.584	0.561	0.562	0.523
3500	2	8	2	0.427	0.457	0.492	0.515	0.506	0.421	0.422	0.470
3500	2	8	3	0.468	0.580	0.652	0.673	0.646	0.598	0.569	0.589
3500	2	8	4	0.065	0.133	0.174	0.146	0.168	0.164	0.260	0.130
3500	2	9	1	0.406	0.502	0.569	0.593	0.574	0.550	0.556	0.515
3500	2	9	2	0.421	0.445	0.479	0.506	0.493	0.411	0.418	0.460
3500	2	9	3	0.463	0.570	0.643	0.670	0.638	0.587	0.563	0.582
3500	2	9	4	0.064	0.129	0.168	0.142	0.164	0.160	0.258	0.127
3500	2	10	1	0.402	0.495	0.561	0.589	0.567	0.542	0.552	0.509
3500	2	10	2	0.418	0.436	0.469	0.499	0.483	0.403	0.415	0.453
3500	2	10	3	0.459	0.563	0.636	0.668	0.631	0.579	0.559	0.577
3500	2	10	4	0.064	0.126	0.163	0.139	0.160	0.157	0.256	0.124
3500	2	11	1	0.388	0.463	0.522	0.565	0.529	0.506	0.533	0.481
3500	2	11	2	0.401	0.398	0.424	0.471	0.436	0.367	0.401	0.420
3500	2	11	3	0.443	0.528	0.603	0.661	0.599	0.544	0.540	0.552
3500	2	11	4	0.063	0.114	0.141	0.124	0.143	0.143	0.249	0.111
4000	1	1	1	0.491	0.733	0.770	0.700	0.742	0.917	0.942	0.676
4000	1	1	2	0.758	0.865	0.901	0.879	0.880	0.934	0.944	0.850
4000	1	1	3	0.758	0.865	0.901	0.879	0.880	0.935	0.944	0.850
4000	1	1	4	0.240	0.211	0.252	0.001	0.226	0.829	0.927	0.210
4000	1	2	1	0.422	0.636	0.706	0.616	0.672	0.776	0.774	0.598
4000	1	2	2	0.560	0.755	0.805	0.750	0.770	0.809	0.779	0.716
4000	1	2	3	0.560	0.757	0.809	0.750	0.774	0.812	0.780	0.718
4000	1	2	4	0.174	0.259	0.301	0.053	0.283	0.601	0.725	0.222
4000	1	3	1	0.372	0.583	0.665	0.581	0.641	0.711	0.681	0.553

4000	1	3	2	0.480	0.700	0.758	0.697	0.722	0.743	0.688	0.657
4000	1	3	3	0.480	0.709	0.770	0.698	0.733	0.754	0.689	0.663
4000	1	3	4	0.141	0.264	0.314	0.113	0.301	0.520	0.623	0.227
4000	1	4	1	0.348	0.547	0.629	0.556	0.613	0.667	0.638	0.523
4000	1	4	2	0.445	0.666	0.724	0.669	0.685	0.701	0.645	0.623
4000	1	4	3	0.445	0.681	0.744	0.674	0.704	0.719	0.647	0.634
4000	1	4	4	0.127	0.256	0.310	0.145	0.302	0.475	0.577	0.225
4000	1	5	1	0.336	0.523	0.601	0.536	0.589	0.638	0.616	0.502
4000	1	5	2	0.428	0.644	0.700	0.653	0.659	0.675	0.623	0.603
4000	1	5	3	0.428	0.665	0.728	0.663	0.687	0.698	0.624	0.618
4000	1	5	4	0.120	0.249	0.301	0.160	0.295	0.447	0.554	0.220
4000	1	6	1	0.329	0.508	0.580	0.521	0.570	0.619	0.603	0.487
4000	1	6	2	0.418	0.631	0.685	0.644	0.643	0.659	0.610	0.590
4000	1	6	3	0.418	0.654	0.719	0.659	0.677	0.685	0.612	0.609
4000	1	6	4	0.116	0.243	0.292	0.165	0.288	0.430	0.540	0.216
4000	1	7	1	0.324	0.497	0.564	0.508	0.556	0.606	0.595	0.476
4000	1	7	2	0.411	0.622	0.676	0.640	0.633	0.648	0.602	0.583
4000	1	7	3	0.411	0.648	0.713	0.659	0.672	0.677	0.604	0.604
4000	1	7	4	0.114	0.238	0.284	0.167	0.280	0.418	0.532	0.212
4000	1	8	1	0.321	0.490	0.551	0.498	0.544	0.597	0.590	0.468
4000	1	8	2	0.407	0.616	0.670	0.638	0.626	0.640	0.597	0.578
4000	1	8	3	0.407	0.643	0.710	0.659	0.669	0.671	0.599	0.601
4000	1	8	4	0.112	0.235	0.277	0.167	0.274	0.410	0.527	0.208
4000	1	9	1	0.319	0.485	0.542	0.489	0.535	0.590	0.587	0.462
4000	1	9	2	0.405	0.611	0.666	0.637	0.622	0.634	0.593	0.574
4000	1	9	3	0.405	0.640	0.709	0.661	0.667	0.667	0.595	0.599
4000	1	9	4	0.111	0.233	0.272	0.167	0.270	0.404	0.523	0.206
4000	1	10	1	0.318	0.481	0.535	0.483	0.528	0.585	0.584	0.457
4000	1	10	2	0.403	0.608	0.663	0.636	0.619	0.630	0.590	0.572
4000	1	10	3	0.403	0.638	0.708	0.662	0.666	0.664	0.592	0.598
4000	1	10	4	0.111	0.231	0.268	0.166	0.266	0.399	0.521	0.204
4000	1	11	1	0.312	0.464	0.496	0.445	0.492	0.563	0.573	0.432
4000	1	11	2	0.394	0.593	0.654	0.640	0.609	0.612	0.579	0.564
4000	1	11	3	0.394	0.627	0.706	0.676	0.666	0.649	0.581	0.595
4000	1	11	4	0.107	0.223	0.246	0.158	0.245	0.379	0.509	0.192
4000	2	1	1	0.767	0.856	0.893	0.780	0.829	0.928	0.819	0.828
4000	2	1	2	0.817	0.870	0.934	0.852	0.853	0.806	0.349	0.866
4000	2	1	3	0.856	0.904	0.941	0.870	0.903	0.952	0.825	0.895
4000	2	1	4	0.033	0.308	0.565	0.080	0.023	0.132	0.137	0.231
4000	2	2	1	0.613	0.745	0.777	0.725	0.757	0.820	0.805	0.716
4000	2	2	2	0.674	0.770	0.806	0.776	0.775	0.702	0.537	0.752
4000	2	2	3	0.707	0.813	0.842	0.808	0.830	0.850	0.813	0.793
4000	2	2	4	0.060	0.228	0.352	0.164	0.133	0.227	0.309	0.195
4000	2	3	1	0.508	0.661	0.707	0.676	0.699	0.728	0.700	0.638
4000	2	3	2	0.547	0.660	0.695	0.684	0.694	0.604	0.498	0.643
4000	2	3	3	0.585	0.733	0.772	0.748	0.764	0.761	0.708	0.708
4000	2	3	4	0.065	0.190	0.275	0.180	0.181	0.221	0.305	0.176
4000	2	4	1	0.455	0.604	0.661	0.645	0.661	0.666	0.635	0.591
4000	2	4	2	0.482	0.581	0.619	0.619	0.631	0.533	0.460	0.573
4000	2	4	3	0.522	0.676	0.728	0.712	0.722	0.700	0.642	0.658
4000	2	4	4	0.063	0.166	0.236	0.175	0.190	0.203	0.286	0.160
4000	2	5	1	0.427	0.565	0.628	0.626	0.633	0.623	0.599	0.561
4000	2	5	2	0.450	0.528	0.567	0.575	0.583	0.485	0.437	0.528
4000	2	5	3	0.490	0.636	0.696	0.692	0.693	0.658	0.606	0.626
4000	2	5	4	0.062	0.150	0.211	0.166	0.186	0.187	0.274	0.148
4000	2	6	1	0.412	0.538	0.604	0.613	0.612	0.593	0.578	0.540
4000	2	6	2	0.431	0.493	0.530	0.545	0.548	0.453	0.423	0.498
4000	2	6	3	0.472	0.608	0.673	0.681	0.672	0.628	0.585	0.605
4000	2	6	4	0.061	0.139	0.194	0.157	0.179	0.175	0.266	0.139
4000	2	7	1	0.402	0.520	0.586	0.603	0.595	0.572	0.565	0.526
4000	2	7	2	0.420	0.470	0.504	0.526	0.523	0.431	0.414	0.478

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4000 2  7 3  0.460 0.589 0.656 0.674 0.656 0.608 0.572 0.591
4000 2  7 4  0.060 0.132 0.181 0.151 0.172 0.167 0.262 0.132
4000 2  8 1  0.396 0.507 0.572 0.596 0.582 0.558 0.557 0.515
4000 2  8 2  0.412 0.454 0.486 0.512 0.504 0.416 0.409 0.464
4000 2  8 3  0.453 0.575 0.644 0.669 0.645 0.594 0.564 0.581
4000 2  8 4  0.059 0.127 0.173 0.146 0.167 0.161 0.258 0.127
4000 2  9 1  0.391 0.498 0.561 0.590 0.572 0.547 0.551 0.508
4000 2  9 2  0.407 0.442 0.473 0.503 0.491 0.405 0.405 0.454
4000 2  9 3  0.448 0.565 0.635 0.666 0.636 0.584 0.558 0.574
4000 2  9 4  0.059 0.124 0.166 0.142 0.162 0.157 0.256 0.124
4000 2 10 1  0.388 0.491 0.553 0.586 0.565 0.540 0.547 0.502
4000 2 10 2  0.403 0.433 0.463 0.496 0.481 0.398 0.402 0.446
4000 2 10 3  0.444 0.558 0.628 0.664 0.629 0.576 0.554 0.569
4000 2 10 4  0.059 0.121 0.162 0.139 0.159 0.154 0.254 0.121
4000 2 11 1  0.375 0.459 0.514 0.562 0.527 0.504 0.528 0.474
4000 2 11 2  0.388 0.395 0.418 0.468 0.435 0.362 0.389 0.414
4000 2 11 3  0.428 0.524 0.594 0.656 0.597 0.540 0.535 0.544
4000 2 11 4  0.058 0.109 0.139 0.124 0.142 0.140 0.247 0.109
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rpk2

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** rmvb.iua
'RMI1' 'BTNK'
1   1
**          Generic (Unclassified) PK data
9999 1  1 1  0.645 0.774 0.784 0.700 0.742 0.917 0.942 0.730
9999 1  1 2  0.895 0.911 0.907 0.880 0.880 0.934 0.944 0.898
9999 1  1 3  0.895 0.911 0.907 0.880 0.880 0.935 0.944 0.898
9999 1  1 4  0.414 0.345 0.289 0.001 0.226 0.829 0.928 0.293
9999 1  2 1  0.614 0.677 0.720 0.625 0.672 0.777 0.774 0.664
9999 1  2 2  0.749 0.785 0.812 0.764 0.770 0.810 0.780 0.778
9999 1  2 3  0.749 0.788 0.817 0.764 0.774 0.814 0.781 0.780
9999 1  2 4  0.388 0.348 0.323 0.053 0.283 0.601 0.727 0.304
9999 1  3 1  0.559 0.624 0.685 0.600 0.642 0.713 0.682 0.621
9999 1  3 2  0.666 0.728 0.768 0.732 0.722 0.747 0.688 0.721
9999 1  3 3  0.666 0.738 0.781 0.733 0.734 0.759 0.690 0.729
9999 1  3 4  0.349 0.330 0.331 0.113 0.301 0.520 0.625 0.301
9999 1  4 1  0.529 0.587 0.654 0.580 0.615 0.671 0.639 0.591
9999 1  4 2  0.626 0.693 0.734 0.715 0.685 0.707 0.645 0.688
9999 1  4 3  0.626 0.711 0.757 0.721 0.707 0.727 0.647 0.701
9999 1  4 4  0.330 0.312 0.324 0.145 0.302 0.475 0.579 0.295
9999 1  5 1  0.513 0.563 0.629 0.562 0.592 0.643 0.617 0.570
9999 1  5 2  0.605 0.671 0.711 0.704 0.660 0.682 0.623 0.668
9999 1  5 3  0.605 0.694 0.742 0.715 0.691 0.708 0.625 0.686
9999 1  5 4  0.319 0.298 0.313 0.160 0.295 0.447 0.556 0.288
9999 1  6 1  0.504 0.547 0.609 0.547 0.574 0.624 0.604 0.555
9999 1  6 2  0.593 0.657 0.696 0.697 0.644 0.666 0.610 0.655
9999 1  6 3  0.593 0.684 0.734 0.714 0.682 0.696 0.612 0.677
9999 1  6 4  0.313 0.289 0.303 0.165 0.288 0.430 0.542 0.281
9999 1  7 1  0.498 0.537 0.593 0.535 0.560 0.611 0.596 0.544
9999 1  7 2  0.585 0.647 0.687 0.693 0.634 0.655 0.602 0.647
9999 1  7 3  0.585 0.678 0.729 0.714 0.678 0.688 0.605 0.672
9999 1  7 4  0.309 0.282 0.294 0.167 0.280 0.418 0.534 0.276
9999 1  8 1  0.494 0.529 0.581 0.525 0.549 0.602 0.591 0.535
9999 1  8 2  0.580 0.641 0.681 0.691 0.628 0.648 0.597 0.642
9999 1  8 3  0.581 0.673 0.727 0.715 0.676 0.682 0.599 0.669
9999 1  8 4  0.306 0.278 0.287 0.167 0.274 0.410 0.529 0.272
9999 1  9 1  0.492 0.524 0.572 0.517 0.541 0.596 0.587 0.529
9999 1  9 2  0.577 0.636 0.677 0.690 0.624 0.642 0.594 0.638
9999 1  9 3  0.577 0.670 0.725 0.717 0.674 0.678 0.596 0.667
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9999 1  9 4  0.304 0.275 0.282 0.167 0.270 0.404 0.525 0.269
9999 1 10 1  0.490 0.520 0.565 0.510 0.534 0.591 0.585 0.524
9999 1 10 2  0.574 0.633 0.674 0.689 0.621 0.638 0.591 0.636
9999 1 10 3  0.575 0.667 0.724 0.718 0.674 0.675 0.593 0.666
9999 1 10 4  0.303 0.272 0.278 0.166 0.266 0.399 0.522 0.267
9999 1 11 1  0.481 0.502 0.526 0.471 0.498 0.569 0.574 0.498
9999 1 11 2  0.564 0.618 0.664 0.690 0.611 0.621 0.580 0.626
9999 1 11 3  0.564 0.657 0.724 0.730 0.675 0.662 0.582 0.662
9999 1 11 4  0.298 0.261 0.255 0.158 0.245 0.379 0.511 0.253
9999 2  1 1  0.841 0.910 0.900 0.790 0.835 0.948 0.907 0.863
9999 2  1 2  0.847 0.906 0.939 0.862 0.855 0.837 0.547 0.885
9999 2  1 3  0.912 0.948 0.945 0.879 0.907 0.966 0.915 0.923
9999 2  1 4  0.065 0.434 0.595 0.087 0.024 0.134 0.144 0.273
9999 2  2 1  0.740 0.787 0.791 0.735 0.765 0.838 0.855 0.766
9999 2  2 2  0.771 0.794 0.816 0.789 0.788 0.737 0.661 0.790
9999 2  2 3  0.820 0.845 0.852 0.820 0.836 0.866 0.863 0.835
9999 2  2 4  0.183 0.313 0.389 0.173 0.142 0.243 0.326 0.257
9999 2  3 1  0.634 0.700 0.728 0.691 0.708 0.747 0.734 0.689
9999 2  3 2  0.652 0.679 0.707 0.703 0.708 0.635 0.586 0.684
9999 2  3 3  0.700 0.762 0.788 0.767 0.771 0.778 0.741 0.754
9999 2  3 4  0.195 0.250 0.303 0.188 0.194 0.240 0.321 0.233
9999 2  4 1  0.574 0.642 0.688 0.663 0.671 0.684 0.663 0.642
9999 2  4 2  0.584 0.598 0.633 0.640 0.645 0.561 0.532 0.613
9999 2  4 3  0.632 0.705 0.749 0.737 0.731 0.718 0.670 0.704
9999 2  4 4  0.188 0.212 0.258 0.182 0.202 0.221 0.301 0.212
9999 2  5 1  0.541 0.601 0.658 0.645 0.644 0.640 0.624 0.611
9999 2  5 2  0.548 0.544 0.582 0.597 0.596 0.510 0.502 0.567
9999 2  5 3  0.596 0.664 0.721 0.720 0.703 0.676 0.631 0.673
9999 2  5 4  0.183 0.189 0.230 0.172 0.197 0.204 0.288 0.196
9999 2  6 1  0.522 0.573 0.636 0.633 0.623 0.610 0.602 0.590
9999 2  6 2  0.527 0.508 0.546 0.568 0.560 0.477 0.484 0.536
9999 2  6 3  0.575 0.636 0.701 0.710 0.683 0.647 0.608 0.652
9999 2  6 4  0.179 0.174 0.210 0.163 0.189 0.191 0.280 0.184
9999 2  7 1  0.511 0.554 0.619 0.624 0.607 0.589 0.588 0.575
9999 2  7 2  0.514 0.484 0.520 0.548 0.534 0.454 0.474 0.516
9999 2  7 3  0.562 0.616 0.685 0.703 0.668 0.626 0.595 0.638
9999 2  7 4  0.176 0.165 0.197 0.156 0.182 0.182 0.274 0.176
9999 2  8 1  0.503 0.540 0.606 0.617 0.594 0.575 0.579 0.565
9999 2  8 2  0.506 0.467 0.502 0.535 0.515 0.438 0.466 0.501
9999 2  8 3  0.553 0.602 0.674 0.699 0.657 0.612 0.585 0.628
9999 2  8 4  0.174 0.158 0.187 0.150 0.176 0.176 0.271 0.170
9999 2  9 1  0.498 0.530 0.597 0.611 0.585 0.564 0.572 0.557
9999 2  9 2  0.500 0.455 0.489 0.525 0.501 0.427 0.461 0.491
9999 2  9 3  0.547 0.592 0.666 0.696 0.648 0.601 0.579 0.621
9999 2  9 4  0.173 0.153 0.180 0.146 0.171 0.172 0.268 0.166
9999 2 10 1  0.494 0.523 0.589 0.607 0.577 0.556 0.568 0.551
9999 2 10 2  0.496 0.447 0.480 0.518 0.491 0.419 0.458 0.483
9999 2 10 3  0.543 0.584 0.659 0.694 0.642 0.594 0.575 0.615
9999 2 10 4  0.172 0.150 0.175 0.143 0.168 0.169 0.267 0.163
9999 2 11 1  0.478 0.489 0.551 0.584 0.540 0.519 0.548 0.522
9999 2 11 2  0.478 0.407 0.435 0.489 0.443 0.381 0.442 0.449
9999 2 11 3  0.525 0.549 0.628 0.687 0.611 0.557 0.555 0.591
9999 2 11 4  0.168 0.135 0.151 0.127 0.149 0.153 0.259 0.148
```

rpk3

```
** rm2vb.iua
'RMI2' 'BTNK'
1   1
**          Generic (Unclassified) PK data
```

9999	1	1	1	0.645	0.774	0.784	0.700	0.742	0.917	0.942	0.730
9999	1	1	2	0.895	0.911	0.907	0.880	0.880	0.934	0.944	0.898
9999	1	1	3	0.895	0.911	0.907	0.880	0.880	0.935	0.944	0.898
9999	1	1	4	0.414	0.345	0.289	0.001	0.226	0.829	0.928	0.293
9999	1	2	1	0.614	0.677	0.720	0.625	0.672	0.777	0.774	0.664
9999	1	2	2	0.749	0.785	0.812	0.764	0.770	0.810	0.780	0.778
9999	1	2	3	0.749	0.788	0.817	0.764	0.774	0.814	0.781	0.780
9999	1	2	4	0.388	0.348	0.323	0.053	0.283	0.601	0.727	0.304
9999	1	3	1	0.559	0.624	0.685	0.600	0.642	0.713	0.682	0.621
9999	1	3	2	0.666	0.728	0.768	0.732	0.722	0.747	0.688	0.721
9999	1	3	3	0.666	0.738	0.781	0.733	0.734	0.759	0.690	0.729
9999	1	3	4	0.349	0.330	0.331	0.113	0.301	0.520	0.625	0.301
9999	1	4	1	0.529	0.587	0.654	0.580	0.615	0.671	0.639	0.591
9999	1	4	2	0.626	0.693	0.734	0.715	0.685	0.707	0.645	0.688
9999	1	4	3	0.626	0.711	0.757	0.721	0.707	0.727	0.647	0.701
9999	1	4	4	0.330	0.312	0.324	0.145	0.302	0.475	0.579	0.295
9999	1	5	1	0.513	0.563	0.629	0.562	0.592	0.643	0.617	0.570
9999	1	5	2	0.605	0.671	0.711	0.704	0.660	0.682	0.623	0.668
9999	1	5	3	0.605	0.694	0.742	0.715	0.691	0.708	0.625	0.686
9999	1	5	4	0.319	0.298	0.313	0.160	0.295	0.447	0.556	0.288
9999	1	6	1	0.504	0.547	0.609	0.547	0.574	0.624	0.604	0.555
9999	1	6	2	0.593	0.657	0.696	0.697	0.644	0.666	0.610	0.655
9999	1	6	3	0.593	0.684	0.734	0.714	0.682	0.696	0.612	0.677
9999	1	6	4	0.313	0.289	0.303	0.165	0.288	0.430	0.542	0.281
9999	1	7	1	0.498	0.537	0.593	0.535	0.560	0.611	0.596	0.544
9999	1	7	2	0.585	0.647	0.687	0.693	0.634	0.655	0.602	0.647
9999	1	7	3	0.585	0.678	0.729	0.714	0.678	0.688	0.605	0.672
9999	1	7	4	0.309	0.282	0.294	0.167	0.280	0.418	0.534	0.276
9999	1	8	1	0.494	0.529	0.581	0.525	0.549	0.602	0.591	0.535
9999	1	8	2	0.580	0.641	0.681	0.691	0.628	0.648	0.597	0.642
9999	1	8	3	0.581	0.673	0.727	0.715	0.676	0.682	0.599	0.669
9999	1	8	4	0.306	0.278	0.287	0.167	0.274	0.410	0.529	0.272
9999	1	9	1	0.492	0.524	0.572	0.517	0.541	0.596	0.587	0.529
9999	1	9	2	0.577	0.636	0.677	0.690	0.624	0.642	0.594	0.638
9999	1	9	3	0.577	0.670	0.725	0.717	0.674	0.678	0.596	0.667
9999	1	9	4	0.304	0.275	0.282	0.167	0.270	0.404	0.525	0.269
9999	1	10	1	0.490	0.520	0.565	0.510	0.534	0.591	0.585	0.524
9999	1	10	2	0.574	0.633	0.674	0.689	0.621	0.638	0.591	0.636
9999	1	10	3	0.575	0.667	0.724	0.718	0.674	0.675	0.593	0.666
9999	1	10	4	0.303	0.272	0.278	0.166	0.266	0.399	0.522	0.267
9999	1	11	1	0.481	0.502	0.526	0.471	0.498	0.569	0.574	0.498
9999	1	11	2	0.564	0.618	0.664	0.690	0.611	0.621	0.580	0.626
9999	1	11	3	0.564	0.657	0.724	0.730	0.675	0.662	0.582	0.662
9999	1	11	4	0.298	0.261	0.255	0.158	0.245	0.379	0.511	0.253
9999	2	1	1	0.841	0.910	0.900	0.790	0.835	0.948	0.907	0.863
9999	2	1	2	0.847	0.906	0.939	0.862	0.855	0.837	0.547	0.885
9999	2	1	3	0.912	0.948	0.945	0.879	0.907	0.966	0.915	0.923
9999	2	1	4	0.065	0.434	0.595	0.087	0.024	0.134	0.144	0.273
9999	2	2	1	0.740	0.787	0.791	0.735	0.765	0.838	0.855	0.766
9999	2	2	2	0.771	0.794	0.816	0.789	0.788	0.737	0.661	0.790
9999	2	2	3	0.820	0.845	0.852	0.820	0.836	0.866	0.863	0.835
9999	2	2	4	0.183	0.313	0.389	0.173	0.142	0.243	0.326	0.257
9999	2	3	1	0.634	0.700	0.728	0.691	0.708	0.747	0.734	0.689
9999	2	3	2	0.652	0.679	0.707	0.703	0.708	0.635	0.586	0.684
9999	2	3	3	0.700	0.762	0.788	0.767	0.771	0.778	0.741	0.754
9999	2	3	4	0.195	0.250	0.303	0.188	0.194	0.240	0.321	0.233
9999	2	4	1	0.574	0.642	0.688	0.663	0.671	0.684	0.663	0.642
9999	2	4	2	0.584	0.598	0.633	0.640	0.645	0.561	0.532	0.613
9999	2	4	3	0.632	0.705	0.749	0.737	0.731	0.718	0.670	0.704
9999	2	4	4	0.188	0.212	0.258	0.182	0.202	0.221	0.301	0.212
9999	2	5	1	0.541	0.601	0.658	0.645	0.644	0.640	0.624	0.611

```
9999 2  5 2  0.548 0.544 0.582 0.597 0.596 0.510 0.502 0.567
9999 2  5 3  0.596 0.664 0.721 0.720 0.703 0.676 0.631 0.673
9999 2  5 4  0.183 0.189 0.230 0.172 0.197 0.204 0.288 0.196
9999 2  6 1  0.522 0.573 0.636 0.633 0.623 0.610 0.602 0.590
9999 2  6 2  0.527 0.508 0.546 0.568 0.560 0.477 0.484 0.536
9999 2  6 3  0.575 0.636 0.701 0.710 0.683 0.647 0.608 0.652
9999 2  6 4  0.179 0.174 0.210 0.163 0.189 0.191 0.280 0.184
9999 2  7 1  0.511 0.554 0.619 0.624 0.607 0.589 0.588 0.575
9999 2  7 2  0.514 0.484 0.520 0.548 0.534 0.454 0.474 0.516
9999 2  7 3  0.562 0.616 0.685 0.703 0.668 0.626 0.595 0.638
9999 2  7 4  0.176 0.165 0.197 0.156 0.182 0.182 0.274 0.176
9999 2  8 1  0.503 0.540 0.606 0.617 0.594 0.575 0.579 0.565
9999 2  8 2  0.506 0.467 0.502 0.535 0.515 0.438 0.466 0.501
9999 2  8 3  0.553 0.602 0.674 0.699 0.657 0.612 0.585 0.628
9999 2  8 4  0.174 0.158 0.187 0.150 0.176 0.176 0.271 0.170
9999 2  9 1  0.498 0.530 0.597 0.611 0.585 0.564 0.572 0.557
9999 2  9 2  0.500 0.455 0.489 0.525 0.501 0.427 0.461 0.491
9999 2  9 3  0.547 0.592 0.666 0.696 0.648 0.601 0.579 0.621
9999 2  9 4  0.173 0.153 0.180 0.146 0.171 0.172 0.268 0.166
9999 2 10 1  0.494 0.523 0.589 0.607 0.577 0.556 0.568 0.551
9999 2 10 2  0.496 0.447 0.480 0.518 0.491 0.419 0.458 0.483
9999 2 10 3  0.543 0.584 0.659 0.694 0.642 0.594 0.575 0.615
9999 2 10 4  0.172 0.150 0.175 0.143 0.168 0.169 0.267 0.163
9999 2 11 1  0.478 0.489 0.551 0.584 0.540 0.519 0.548 0.522
9999 2 11 2  0.478 0.407 0.435 0.489 0.443 0.381 0.442 0.449
9999 2 11 3  0.525 0.549 0.628 0.687 0.611 0.557 0.555 0.591
9999 2 11 4  0.168 0.135 0.151 0.127 0.149 0.153 0.259 0.148
```

rprio

```
******* rprio - Red Weapon Selection Table ************
*********************************************************
*
* Firer   Tgt     Range
* Unit    Unit    Band      Min     Max
* Type    Type    Num       Range   Range   Priority   Weapon
* ------ ------  ------    -----   -----   --------   ------
 'RTNK'  'BTNK'   1           0     2000       1       'RKE1'
                                               2       'RMI1'
                                               3       'NULL'
* ------ ------  ------    -----   -----   --------   ------
                  2        2000    3500       1       'RMI1'
                                               2       'RKE1'
                                               3       'NULL'
* ------ ------  ------    -----   -----   --------   ------
                  3        3500    6000       1       'NULL'
                                               2       'NULL'
                                               3       'NULL'
* ------ ------  ------    -----   -----   --------   ------
 'RAPC'  'BTNK'   1           0     3500       1       'RMI2'
                                               2       'NULL'
                                               3       'NULL'
* ------ ------  ------    -----   -----   --------   ------
                  2        3500    5000       1       'NULL'
                                               2       'NULL'
                                               3       'NULL'
* ------ ------  ------    -----   -----   --------   ------
                  3        5000    6000       1       'NULL'
                                               2       'NULL'
                                               3       'NULL'
```

```
* ---------------------------------------------------
```

rsens

```
***
'RTNK'
 'THERMAL'
 'TWENTY'
-- NFOV
     0.02    0.3     0.04    0.05    0.06    0.07    0.08    0.10    0.15    0.23
     0.4     0.5     0.6     1.0     1.5     2.0     3.0     4.2     6.0     9.0
     1.0     1.4     1.9     2.3     3.0     3.5     4.0     4.5     5.0     5.5
     6.0     6.5     7.0     7.4     7.8     8.2     8.6     8.8     8.9     9.0
-- WFOV
     0.02    0.3     0.04    0.05    0.06    0.07    0.08    0.10    0.15    0.23
     0.4     0.5     0.6     1.0     1.5     2.0     3.0     4.2     6.0     9.0
     0.3     0.4     0.5     0.6     0.7     0.8     0.9     1.0     1.1     1.2
     1.4     1.6     1.8     2.0     2.2     2.4     2.6     2.8     3.0     3.2
-- Horizontal FOS, Vertical FOS
       22.0                8.0
-- Horizontal NFOV, Vertical NFOV
       1.4                 2.8
-- Horizontal WFOV, Vertical WFOV
       6.4                12.8
-- NFOV Magnification, WFOV Magnification
       1.0                 1.0
-- NFOV Stat Acq Level, NFOV Mov Acq Level
        4.0               4.0
-- WFOV Stat Acq Level, WFOV Mov Acq Level
       1.5                 1.0
-- N(dets), pfalse(HD), pfalse(FE)
      1        0.0         0.0
-- Pinpoint probabilities
 'BKE1' 0.03
 'END'
```

runit

```
********************* red army ***************************************
*****************************************************************************
* unit      type  exposure loc  vehicle  weap1   weap2   weap3 sensor
'RTNK' 4  'Attacker' 'FE'  0000. 'RTNK' 'RKE1'  'RMI1' 'NULL'  'RTNK'
'RAPC' 2  'Attacker' 'FE'  0100. 'RAPC' 'RMI2'  'NULL' 'NULL'  'RTNK'
```

rveh

```
*********************************************
'RTNK'
  Turret Dimensions:  H, W, FL, BL
           0.8    1.2    1.55   1.55
  Hull Dimensions: H, W, FL, BL
           1.8    1.65    3.4    3.4
  Target Acquisition variables:
          0.30   0.50     Opt cont
          0.60   2.10     Th cont
          1.5    4.0    Char Dim
          22.0   44.0     Radar Cross Section
  Movement: Speed, Accel, Decel, Pausedf
```

```
        3.333   1.000   2.000     0
  Times to Leave: Break Los, Empty, F-killed
          10.00    30.00   130.00
  Act Prot: Arc, Prob Det,
           0.    0
  Smoke Grenades: Ngrnd, Prob, Smokes,Durat
           0 0.00 0.00 0.00 0.00 0.00 0.00
  Laser Warning Inputs: IF-LWR   POP-SMK   ENGAGE  HIDE  NFOV TSERCH
                    F   0.0       F         F       F     3.0   30.0
'RAPC'
  Turret Dimensions:  H, W, FL, BL
          0.7    1.1     1.35   1.35
  Hull Dimensions: H, W, FL, BL
          1.7    1.45    3.0    3.0
  Target Acquisition variables:
         0.20   0.40      Opt cont
         0.50   1.80      Th cont
         1.3    3.0     Char Dim
         15.0   33.0      Radar Cross Section
  Movement: Speed, Accel, Decel, Pausedf
         3.333   1.000   2.000     0
  Times to Leave: Break Los, Empty, F-killed
          10.00    30.00   130.00
  Act Prot: Arc, Prob Det,
           0.    0
  Smoke Grenades: Ngrnd, Prob, Smokes,Durat
           0 0.00 0.00 0.00 0.00 0.00 0.00
  Laser Warning Inputs: IF-LWR   POP-SMK   ENGAGE  HIDE  NFOV TSERCH
                    F   0.0       F         F       F     3.0   30.0
```

rweap

```
*******************************************
'RKE1'
  Weap: Kind,firemax,nrds,halt,tact,nrpt
        1     3500.    40    0    1     0  F  F 500. F
  values by range:psense,tof,tfirst,tfix,reliab
    0.00  0.00  0.00  0.00  0.00  0.00   0.00   0.00
    0.4   0.6     0.8     1.0     1.3     1.6  1.9  2.2
    10.   11.     12.     13.     14.     15.   16.  17.
    5.    5.      5.      5.      5.      5.    5.   5.
    8*0.98
  Jockey: ifpop, ntfjoc, timjoc
          0    0    30.0
  Times: tmedin, tmin
           4.5     0.0
  Rof, nrpb
           1.0    1
  Missile: nipods,ntgts,trelod,pabtsm,pabtterr
          0           0    0      0.0    0.00    0.00
  Multiple: ifmult,tmult,nmult,can reload
          0     0.0    0    0
***** Missile - no popdown to reload ****
'RMI1'
  Weap: Kind,firemax,nrds,halt,tact,nrpt
        4     3500.    8    0    1     8  F F 500. F
  values by range:psense,tof,tfirst,tfix,reliab
     8*0.0
     4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0
     8*15.0
```

```
    10.0 8.0 6.0 4.0   2.0 0.0 0.0 0.0
    8*.93
  Jockey: ifpop, ntfjoc, timjoc
          0    0    30.0
  Times: tmedin, tmin
           14.0     0.0
  Rof, nrpb
           1.0    1
  Missile: ifdis,nipods,ntgts,trelod,pabtsm,pabtterr
            0     8      1     0.0   0.50   1.00
  Multiple: ifmult,tmult,nmult,can reload
          0     0.0    0   0
***** Missile - popdown to reload ****
'RMI2'
  Weap: Kind,firemax,nrds,halt,tact,nrpt
        4     3500.   8   1    1     8  F F 500. F
  values by range:psense,tof,tfirst,tfix,reliab
    8*0.0
    4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0
    8*14.0
    10.0 8.0 6.0 4.0   2.0 0.0 0.0 0.0
    8*.94
  Jockey: ifpop, ntfjoc, timjoc
          1    0    30.0
  Times: tmedin, tmin
           8.5     0.0
  Rof, nrpb
           1.0    1
  Missile: ifdis,nipods,ntgts,trelod,pabtsm,pabtterr
            0     2      1    30.0   0.50   1.00
  Multiple: ifmult,tmult,nmult,can reload
              0     0.0    0   0
```

5. Sample Run Scripts

The next two sections describe sample run scripts that can be used to execute the Groundwars model.

5.1 UNIX

If the user is running Groundwars on a computer which uses the UNIX operating system, the run script shown below will run the model. The run script assumes the user's input files are in the directory **/ams/comstock/gw652/sample** and that the Groundwars executable code is located in the directory **/ams/comstock/gw652/src.**

```
#!/bin/sh
#------------------rgw-----run groundwars--------
input_path=/ams/comstock/gw652/sample
outfile=out
#-----------------
outpath=/ams/comstock/gw652/sample/$outfile
if [ -f $outpath ]
then
  echo $outpath exists   `date`  >> list
else
```

```
  if [ ! -f $outpath ]
  then
    echo $outfile > $outpath
    date >>$outpath
    time /ams/comstock/gw652/src/gw652 >>$outpath  2> tmp
    cat tmp >> $outpath
    date >>$outpath
    chmod 660 $outpath
    rm tmp
  fi
fi
```

5.2 PC

If the user is running Groundwars on a IBM compatible PC under the DOS/Windows operating system, the run script shown below will run the model. The run script assumes the user's input files are in the directory from which the following line is invoked, and that the Groundwars executable code is located in the directory **c:\gw652\src**.

```
c:\gw652\src\gw652.exe >out
```

6. Sample Output

The four sections below give sample output at four different levels of increasing detail. At the most general level (Battle Summary), the model lists the average results of all of the replications played. This is the appropriate level for analysis of different cases run during a study. The Replication Summary also lists the outcome of each replication run (number left alive, M-killed, F-killed, etc.). The Event History output lists each event in the battle which occurs, arranged by time of battle. When the game-control flag for reporting the event-queue scheduling and canceling is selected, all events which are scheduled to occur, as well as those events cancelled, are listed in the event history.

6.1 Battle Summary

```
out
Thu Nov 19 14:23:58 est 1998

          Sensor:  BTNK      Alpha*cl=      .00
              RTNK                RAPC
    NFOV
       0    1.000      .00    1.000      .00
     500    1.000      .42    1.000      .58
    1000    1.000      .86    1.000     1.17
    1500    1.000     1.31    1.000     1.79
    2000    1.000     1.78    1.000     2.42
    2500    1.000     2.26     .967     3.07
    3000     .982     2.75     .915     3.74
    3500     .955     3.26     .836     4.07
    4000     .911     3.78     .738     4.61
     WFOV
       0    1.000      .00    1.000      .00
     500    1.000     2.34    1.000     3.27
    1000    1.000     4.86    1.000     6.76
    1500    1.000     7.54    1.000    10.46
    2000    1.000    10.37     .996    14.33
    2500     .997    13.33     .978    18.37
```

3000	.989	16.41	.936	22.68
3500	.968	19.69	.864	25.45
4000	.930	23.11	.767	28.66

Sensor: RTNK Alpha*cl= .00
BTNK

NFOV		
0	1.000	.00
500	1.000	.64
1000	1.000	1.29
1500	1.000	2.00
2000	.980	2.80
2500	.923	3.66
3000	.817	4.16
3500	.690	4.93
4000	.561	6.06
WFOV		
0	1.000	.00
500	1.000	3.56
1000	.999	7.29
1500	.972	11.56
2000	.854	15.48
2500	.644	20.54
3000	.435	30.39
3500	.294	44.90
4000	.201	65.91

Sensor: RTNK Alpha*cl= .00
BTNK

NFOV		
0	1.000	.00
500	1.000	.64
1000	1.000	1.29
1500	1.000	2.00
2000	.980	2.80
2500	.923	3.66
3000	.817	4.16
3500	.690	4.93
4000	.561	6.06
WFOV		
0	1.000	.00
500	1.000	3.56
1000	.999	7.29
1500	.972	11.56
2000	.854	15.48
2500	.644	20.54
3000	.435	30.39
3500	.294	44.90
4000	.201	65.91

==========

GROUNDWARS 6.52

==========

INITIAL CONDITIONS:

Scenario: Red Attack
Terrain: Al Mafraq
Attack Distribution: Frontal

Atmospheric Conditions:
10.0 km. visibility

Pinpoint Restrictions: Only if p-infinity > 0

Replications: 3325
Game range: 4000 meters
Max Time: 1050.0 seconds

Number	Unit Name	Vehicle Name	Weapon1 Name	Weapon2 Name	Weapon3 Name	Sensor Name
4	BTNK	BTNK	BKE1	NULL	NULL	BTNK
4	RTNK	RTNK	RKE1	RMI1	NULL	RTNK
2	RAPC	RAPC	RMI2	NULL	NULL	RTNK

RESULTS:

1.32 exchange ratio
2.13 surviving force ratio

*** Average Losses by Direct Fire ***

	Enemy	Friendly
Red Losses	4.09	.00
Blue Losses	3.10	.00

***** System Exchange Ratios *****
(vehicles killed per vehicle lost)

BTNK	1.32
RTNK	1.18
RAPC	.16

***** Killer - Victim Scoreboard (Kills) *****

Killers | Victims-->	BTNK	RTNK	RAPC	Total
BTNK	.00	2.40	1.69	4.09
RTNK	2.83	.00	.00	2.83
RAPC	.27	.00	.00	.27
Pr. Art	.00	.00	.00	
On-call	.00	.00	.00	
Total Killed ->	3.10	2.40	1.69	

Average Status of Combatants (Dead/Total)

	Alive	M-Dead	F-Dead	M&F-Dead	DEAD
BTNK	20.8	1.6	2.3	42.6	32.7
RTNK	36.3	3.6	3.2	39.1	17.8
RAPC	13.4	2.3	4.9	48.6	30.8

Losses as a Function of Time

Time Interval	RED Dead	BLUE Dead	Exchange Ratio
0- 60	.00	.00	.00
60- 120	.00	.00	.00
120- 180	.73	.09	8.07
180- 240	1.53	.55	2.76
240- 300	2.15	1.15	1.87
300- 360	2.66	1.61	1.65
360- 420	3.05	2.06	1.48
420- 480	3.38	2.40	1.41
480- 540	3.64	2.66	1.37

540-	600	3.86	2.87	1.34
600-	660	3.98	2.99	1.33
660-	720	4.03	3.04	1.32
720-	780	4.04	3.06	1.32
780-	840	4.05	3.07	1.32
840-	900	4.06	3.08	1.32
900-	960	4.07	3.09	1.32
960-	1020	4.08	3.10	1.32
1020-	1080	4.09	3.10	1.32

****
********** BLUE Force Performance **********
****

******* Sensor Performance *******

TARGETS --> RTNK		RAPC		Total	
OBSERVERS |	Reg.	Pinp.	Reg.	Pinp.	Reg.	Pinp.
BTNK	23.4	.0	3.2	.0	26.6	.0
Totals	23.4	.0	3.2	.0	26.6	.0

******* Weapon Performance *******

******** SHOTS ********

TARGETS --> RTNK		RAPC	Total
BTNK	BKE1	47.5	25.1	72.6
BTNK		47.5	25.1	72.6
Totals		47.5	25.1	72.6

******** HITS ********

TARGETS --> RTNK		RAPC	Total
BTNK	BKE1	6.1	5.0	11.1
BTNK		6.1	5.0	11.1
Totals		6.1	5.0	11.1

******** KILLS ********

TARGETS --> RTNK		RAPC	Total
BTNK	BKE1	2.4	1.7	4.1
BTNK		2.4	1.7	4.1
Totals		2.4	1.7	4.1

****
********** RED Force Performance **********
****

******* Sensor Performance *******

TARGETS --> BTNK			Total	
OBSERVERS |	Reg.	Pinp.	Reg.	Pinp.
RTNK	2.6	3.0	2.6	3.0
RAPC	.6	1.0	.6	1.0
Totals	3.2	3.9	3.2	3.9

******* Weapon Performance *******

******** SHOTS ********

TARGETS --> BTNK			Total
RTNK	RKE1	1.9	1.9
RTNK	RMI1	14.3	14.3
RTNK		16.1	16.1
RAPC	RMI2	2.1	2.1
RAPC		2.1	2.1
Totals		18.3	18.3

******** HITS ********

TARGETS --> BTNK			Total
RTNK	RKE1	1.2	1.2
RTNK	RMI1	5.7	5.7
RTNK		6.9	6.9
RAPC	RMI2	.7	.7
RAPC		.7	.7
Totals		7.5	7.5

******** KILLS ********

TARGETS --> BTNK			Total
RTNK	RKE1	.4	.4
RTNK	RMI1	2.5	2.5
RTNK		2.8	2.8
RAPC	RMI2	.3	.3
RAPC		.3	.3
Totals		3.1	3.1

******* SENSOR PERFORMANCE BY RANGE ******

Unit: BTNK vs Unit: RTNK

Range Interval		Total	Regular	Pinpoint
0-	499	.00	.00	.00
500-	999	.05	.05	.00
1000-	1499	.02	.02	.00
1500-	1999	.12	.12	.00
2000-	2499	.65	.64	.00
2500-	2999	1.47	1.46	.01
3000-	3499	3.21	3.19	.02
3500-	3999	17.95	17.95	.00
4000-	4499	.00	.00	.00

Unit: BTNK vs Unit: RAPC

Range Interval		Total	Regular	Pinpoint
0-	499	.00	.00	.00
500-	999	.00	.00	.00
1000-	1499	.00	.00	.00
1500-	1999	.01	.01	.00
2000-	2499	.07	.07	.00
2500-	2999	.15	.15	.00

Range Interval			
3000- 3499	.50	.50	.01
3500- 3999	2.48	2.48	.00
4000- 4499	.00	.00	.00

Unit: RTNK vs Unit: BTNK

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00
500- 999	.09	.09	.00
1000- 1499	.03	.03	.00
1500- 1999	.18	.15	.03
2000- 2499	.83	.60	.23
2500- 2999	1.38	.70	.68
3000- 3499	2.24	.45	1.79
3500- 3999	.82	.60	.22
4000- 4499	.00	.00	.00

Unit: RAPC vs Unit: BTNK

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00
500- 999	.01	.01	.00
1000- 1499	.00	.00	.00
1500- 1999	.02	.02	.00
2000- 2499	.11	.07	.03
2500- 2999	.24	.09	.15
3000- 3499	.95	.18	.77
3500- 3999	.27	.27	.00
4000- 4499	.00	.00	.00

***** FOV SENSOR PERFORMANCE BY RANGE *****

Unit: BTNK

	Tgts Actually Acquired			Tgts W-Acq, N-Failed	
Range Interval	#	Avg W Time	Avg N Time	#	Avg W Time
0- 499	.00	.00	.00	.00	.00
500- 999	.05	1.82	3.00	.00	.00
1000- 1499	.02	6.10	3.00	.00	.00
1500- 1999	.13	8.17	3.00	.00	.00
2000- 2499	.72	8.37	3.00	.00	1.72
2500- 2999	1.61	8.35	3.00	.01	8.82
3000- 3499	3.68	7.80	3.00	.19	8.80
3500- 3999	20.43	6.04	3.00	.59	7.93
4000- 4499	.00	.00	.00	.00	.00
Totals	26.64	6.49	3.00	.78	8.14

Unit: RTNK

	Tgts Actually Acquired			Tgts W-Acq, N-Failed	
Range Interval	#	Avg W Time	Avg N Time	#	Avg W Time
0- 499	.00	.00	.00	.00	.00
500- 999	.09	4.76	3.00	.00	.00
1000- 1499	.03	10.40	3.00	.00	.00
1500- 1999	.15	11.47	3.00	.00	.00
2000- 2499	.60	9.32	3.00	.00	.00
2500- 2999	.70	8.07	3.00	.00	.00

3000- 3499	.45	7.70	3.00	.00	.00
3500- 3999	.60	7.59	3.00	.00	.00
4000- 4499	.00	.00	.00	.00	.00
Totals	2.61	8.30	3.00	.00	.00

Unit: RAPC

	Tgts Actually Acquired			Tgts W-Acq, N-Failed	
Range Interval	#	Avg W Time	Avg N Time	#	Avg W Time
0- 499	.00	4.39	3.00	.00	.00
500- 999	.01	7.06	3.00	.00	.00
1000- 1499	.00	11.41	3.00	.00	.00
1500- 1999	.02	11.59	3.00	.00	.00
2000- 2499	.07	10.55	3.00	.00	.00
2500- 2999	.09	8.41	3.00	.00	.00
3000- 3499	.18	26.16	3.00	.00	.00
3500- 3999	.27	6.33	3.00	.00	.00
4000- 4499	.00	.00	.00	.00	.00
Totals	.64	12.90	3.00	.00	.00

******* WEAPON PERFORMANCE BY RANGE ******

Unit/Weap: BTNK /BKE1 vs Unit: RTNK

Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.07	.06	.03
1000- 1499	.06	.03	.01
1500- 1999	1.08	.32	.12
2000- 2499	7.72	1.41	.53
2500- 2999	18.34	2.26	.87
3000- 3499	20.24	2.00	.83
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.96	.87	.84
1000	.57	.66	.38
1500	.31	.54	.17
2000	.26	.54	.14
2500	.12	.49	.06
3000	.11	.48	.05
3500	.08	.44	.04
4000	.00	.00	.00

Unit/Weap: BTNK / vs Unit: RTNK

Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.07	.06	.03
1000- 1499	.06	.03	.01
1500- 1999	1.08	.32	.12
2000- 2499	7.72	1.41	.53
2500- 2999	18.34	2.26	.87
3000- 3499	20.24	2.00	.83
3500- 3999	.00	.00	.00

Unit/Weap: BTNK /BKE1 vs Unit: RAPC

Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.01	.01	.00
1500- 1999	.13	.04	.01
2000- 2499	.75	.21	.07
2500- 2999	2.93	.57	.21
3000- 3499	21.26	4.22	1.39
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.94	.87	.82
1000	.51	.66	.34
1500	.27	.54	.15
2000	.22	.54	.12
2500	.10	.49	.05
3000	.09	.48	.04
3500	.07	.44	.03
4000	.00	.00	.00

Unit/Weap: BTNK /		vs Unit: RAPC	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.01	.01	.00
1500- 1999	.13	.04	.01
2000- 2499	.75	.21	.07
2500- 2999	2.93	.57	.21
3000- 3499	21.26	4.22	1.39
3500- 3999	.00	.00	.00

Unit/Weap: RTNK /RKE1		vs Unit: BTNK	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.14	.09	.03
1000- 1499	.10	.07	.02
1500- 1999	.52	.37	.11
2000- 2499	.82	.49	.16
2500- 2999	.26	.13	.05
3000- 3499	.03	.01	.00
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.67	.66	.44
1000	.67	.66	.44
1500	.78	.66	.51
2000	.67	.65	.44
2500	.53	.58	.30
3000	.42	.52	.22
3500	.34	.47	.16
4000	.00	.00	.00

Unit/Weap: RTNK /RMI1		vs Unit: BTNK	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.17	.12	.05
2000- 2499	1.69	.93	.41
2500- 2999	5.06	2.26	.95
3000- 3499	7.35	2.39	1.06
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.61	.59	.36
1000	.55	.59	.33
1500	.76	.66	.50
2000	.64	.66	.43
2500	.51	.59	.30
3000	.40	.55	.22
3500	.32	.52	.17
4000	.00	.00	.00

Unit/Weap: RTNK /		vs Unit: BTNK	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.14	.09	.03
1000- 1499	.10	.07	.02
1500- 1999	.68	.49	.16
2000- 2499	2.51	1.42	.57
2500- 2999	5.32	2.39	1.00
3000- 3499	7.37	2.40	1.06
3500- 3999	.00	.00	.00

Unit/Weap: RAPC /RMI2		vs Unit: BTNK	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.03	.02	.01
2000- 2499	.16	.08	.03
2500- 2999	.39	.14	.06
3000- 3499	1.56	.42	.17
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.61	.59	.36
1000	.55	.59	.33
1500	.76	.66	.50
2000	.64	.66	.43
2500	.51	.59	.30
3000	.40	.55	.22
3500	.32	.52	.17
4000	.00	.00	.00

```
Unit/Weap: RAPC    /          vs Unit: BTNK
Range Interval |   Shots     Hits    Kills
      0-  499        .00      .00      .00
    500-  999        .00      .00      .00
   1000- 1499        .00      .00      .00
   1500- 1999        .03      .02      .01
   2000- 2499        .16      .08      .03
   2500- 2999        .39      .14      .06
   3000- 3499       1.56      .42      .17
   3500- 3999        .00      .00      .00

   27.07 blue rnds consumed per red unit killed
   17.62 red rnds consumed per blue unit killed

     .00 avg num times each blue unit scheds a delayed emg firing
     .00 avg num times each red  unit scheds a delayed emg firing

     .00 avg num times each blue unit fires a delayed emg round
     .00 avg num times each red  unit fires a delayed emg round

     .00 avg extra time each blue unit scheds a delayed emg firing
     .00 avg extra time each red  unit scheds a delayed emg firing

     .00 avg extra time each blue unit fires a delayed emg round
     .00 avg extra time each red  unit fires a delayed emg round


relative width statistics (95.% conf)

                        half     lower    upper    reltv
                mean   length    bound    bound    width
                ----   ------    -----    -----    -----
  blue dead     3.10     .04      3.06     3.15      .01      good
  red  dead     4.09     .06      4.03     4.15      .01      good

  exch ratio    1.32     .07      1.25     1.38      .05      good

  blue rnds    18.15     .20     17.95    18.34      .01      good
  red  rnds     3.05     .04      3.00     3.09      .01      good

Thu Nov 19 14:27:13 est 1998
```

6.2 Replication Summary

```
out
Thu Nov 19 14:35:37 est 1998

        Sensor:  BTNK      Alpha*cl=      .00
            RTNK              RAPC
   NFOV
     0    1.000     .00    1.000     .00
   500    1.000     .42    1.000     .58
  1000    1.000     .86    1.000    1.17
  1500    1.000    1.31    1.000    1.79
  2000    1.000    1.78    1.000    2.42
  2500    1.000    2.26     .967    3.07
  3000     .982    2.75     .915    3.74
  3500     .955    3.26     .836    4.07
  4000     .911    3.78     .738    4.61
```

WFOV				
0	1.000	.00	1.000	.00
500	1.000	2.34	1.000	3.27
1000	1.000	4.86	1.000	6.76
1500	1.000	7.54	1.000	10.46
2000	1.000	10.37	.996	14.33
2500	.997	13.33	.978	18.37
3000	.989	16.41	.936	22.68
3500	.968	19.69	.864	25.45
4000	.930	23.11	.767	28.66

Sensor: RTNK Alpha*cl= .00
BTNK

NFOV		
0	1.000	.00
500	1.000	.64
1000	1.000	1.29
1500	1.000	2.00
2000	.980	2.80
2500	.923	3.66
3000	.817	4.16
3500	.690	4.93
4000	.561	6.06

WFOV		
0	1.000	.00
500	1.000	3.56
1000	.999	7.29
1500	.972	11.56
2000	.854	15.48
2500	.644	20.54
3000	.435	30.39
3500	.294	44.90
4000	.201	65.91

Sensor: RTNK Alpha*cl= .00
BTNK

NFOV		
0	1.000	.00
500	1.000	.64
1000	1.000	1.29
1500	1.000	2.00
2000	.980	2.80
2500	.923	3.66
3000	.817	4.16
3500	.690	4.93
4000	.561	6.06

WFOV		
0	1.000	.00
500	1.000	3.56
1000	.999	7.29
1500	.972	11.56
2000	.854	15.48
2500	.644	20.54
3000	.435	30.39
3500	.294	44.90
4000	.201	65.91

	status of combatants										average rounds used per sys		Seeds for next rep	
	|----blue----|					|----red-----|							
rep	al	mo	fo	mf	k	al	mo	fo	mf	k	blue	red	general	LOS
1	1	0	0	2	1	1	0	0	2	3	25.0	2.3	1223423358	1384844454
2	0	0	0	2	2	5	0	0	0	1	18.8	3.2	977260115	232126988

3	1	0	0	1	2	0	0	1	3	2	22.5	2.5	2031716352	99744729
4	0	0	0	2	2	5	1	0	0	0	6.8	4.0	1292943772	454605543
5	2	0	0	0	2	0	0	0	5	1	9.3	1.7	491811045	1960133462
6	0	0	0	2	2	1	0	1	1	3	24.0	4.0	1597819577	1683888155
7	1	0	0	2	1	2	0	0	4	0	15.5	.8	7124244	554673958
8	0	0	1	2	1	2	2	1	0	1	18.3	3.5	1235346487	1697757280
9	1	0	0	2	1	2	0	1	0	3	26.8	3.2	1827289356	1455419590
10	3	0	0	1	0	0	0	0	5	1	23.8	2.0	817370876	897278514
11	0	0	0	2	2	1	0	1	4	0	18.8	4.0	1171935539	774702973
12	0	0	0	3	1	4	0	0	2	0	11.8	6.0	609351331	907719736
13	1	0	0	1	2	0	1	0	4	1	23.3	2.2	336287778	1403042815
14	2	0	0	2	0	0	0	1	4	1	26.5	2.5	1642435870	779559595
15	0	0	0	2	2	3	0	0	2	1	16.5	4.2	1184562562	403256689
16	0	0	0	3	1	3	0	0	2	1	15.0	2.5	1100090768	272725105
17	0	0	0	3	1	1	2	1	2	0	20.3	3.0	1396819377	405246393
18	0	0	0	4	0	4	0	0	1	1	13.3	2.8	2114234317	1816454435
19	0	0	0	3	1	2	0	0	3	1	16.3	2.0	1376193798	1547213155
20	0	0	0	2	2	4	0	0	2	0	11.3	2.3	1088064960	717703736
21	0	0	0	1	3	4	0	0	1	1	10.3	4.2	1076918272	1404748076
22	2	0	0	1	1	0	0	0	4	2	20.8	1.2	1730591863	954336659
23	1	0	0	2	1	0	0	1	3	2	15.8	2.5	1294712206	1696986678
24	0	0	0	2	2	4	0	0	1	1	6.8	4.0	796161562	910093397
25	0	1	0	2	1	0	1	1	2	2	33.5	4.7	285780541	385723159
26	1	0	1	2	0	0	0	0	2	4	21.5	3.0	1055135233	1924466720
27	0	0	0	1	3	6	0	0	0	0	7.0	3.8	155873855	2137395722
28	0	0	0	3	1	1	0	0	2	3	23.8	5.2	1250444110	910367353
29	0	0	0	2	2	2	0	0	3	1	11.3	4.5	947270353	731231009
30	0	0	0	3	1	3	0	0	2	1	13.8	1.5	803887786	1825895061

GROUNDWARS 6.52

INITIAL CONDITIONS:

Scenario: Red Attack
Terrain: Al Mafraq
Attack Distribution: Frontal

Atmospheric Conditions:
10.0 km. visibility
Pinpoint Restrictions: Only if p-infinity > 0

Replications: 30
Game range: 4000 meters
Max Time: 1050.0 seconds

Number	Unit Name	Vehicle Name	Weapon1 Name	Weapon2 Name	Weapon3 Name	Sensor Name
4	BTNK	BTNK	BKE1	NULL	NULL	BTNK
4	RTNK	RTNK	RKE1	RMI1	NULL	RTNK
2	RAPC	RAPC	RMI2	NULL	NULL	RTNK

RESULTS:

1.10 exchange ratio
3.94 surviving force ratio

*** Average Losses by Direct Fire ***

	Enemy	Friendly
Red Losses	3.77	.00
Blue Losses	3.43	.00

***** System Exchange Ratios *****
(vehicles killed per vehicle lost)

BTNK	1.10
RTNK	1.47
RAPC	.18

***** Killer - Victim Scoreboard (Kills) *****

Killers | Victims-->	BTNK	RTNK	RAPC	Total
BTNK	.00	2.13	1.63	3.77
RTNK	3.13	.00	.00	3.13
RAPC	.30	.00	.00	.30
Pr. Art	.00	.00	.00	
On-call	.00	.00	.00	
Total Killed ->	3.43	2.13	1.63	

Average Status of Combatants (Dead/Total)

	Alive	M-Dead	F-Dead	M&F-Dead	DEAD
BTNK	13.3	.8	1.7	50.0	34.2
RTNK	42.5	4.2	5.8	32.5	15.0
RAPC	15.0	3.3	3.3	45.0	33.3

Losses as a Function of Time

Time Interval	RED Dead	BLUE Dead	Exchange Ratio
0- 60	.00	.00	.00
60- 120	.00	.00	.00
120- 180	.67	.07	10.00
180- 240	1.43	.60	2.39
240- 300	1.90	1.17	1.63
300- 360	2.37	1.70	1.39
360- 420	2.67	2.20	1.21
420- 480	2.97	2.37	1.25
480- 540	3.13	2.87	1.09
540- 600	3.43	3.17	1.08
600- 660	3.63	3.30	1.10
660- 720	3.70	3.33	1.11
720- 780	3.73	3.37	1.11
780- 840	3.73	3.37	1.11
840- 900	3.73	3.37	1.11
900- 960	3.77	3.40	1.11
960- 1020	3.77	3.43	1.10
1020- 1080	3.77	3.43	1.10

****
********** BLUE Force Performance **********
****

******* Sensor Performance *******

TARGETS --> / OBSERVERS |	RTNK Reg.	RTNK Pinp.	RAPC Reg.	RAPC Pinp.	Total Reg.	Total Pinp.
BTNK |	20.5	.0	3.0	.0	23.5	.0

Totals	20.5	.0	3.0	.0	23.5	.0

******* Weapon Performance *******

******** SHOTS ********

	TARGETS --> RTNK	RAPC	Total
BTNK	BKE1	49.6	20.8	70.3
BTNK		49.6	20.8	70.3
Totals		49.6	20.8	70.3

******** HITS ********

	TARGETS --> RTNK	RAPC	Total
BTNK	BKE1	6.3	5.0	11.3
BTNK		6.3	5.0	11.3
Totals		6.3	5.0	11.3

******** KILLS ********

	TARGETS --> RTNK	RAPC	Total
BTNK	BKE1	2.1	1.6	3.8
BTNK		2.1	1.6	3.8
Totals		2.1	1.6	3.8

****
********** RED Force Performance **********
****

******* Sensor Performance *******

TARGETS --> BTNK			Total	
OBSERVERS	Reg.	Pinp.	Reg.	Pinp.
RTNK	2.6	3.2	2.6	3.2
RAPC	.5	1.2	.5	1.2
Totals	3.2	4.4	3.2	4.4

******* Weapon Performance *******

******** SHOTS ********

	TARGETS --> BTNK	Total
RTNK	RKE1	1.8	1.8
RTNK	RMI1	15.1	15.1
RTNK		16.9	16.9
RAPC	RMI2	1.8	1.8
RAPC		1.8	1.8
Totals		18.6	18.6

******** HITS ********

	TARGETS --> BTNK	Total
RTNK	RKE1	1.2	1.2
RTNK	RMI1	6.8	6.8
RTNK		7.9	7.9

RAPC	RMI2	.8	.8
RAPC		.8	.8
Totals		8.8	8.8

******** KILLS ********

TARGETS -->	BTNK	Total
RTNK	RKE1	.3	.3
RTNK	RMI1	2.8	2.8
RTNK		3.1	3.1
RAPC	RMI2	.3	.3
RAPC		.3	.3
Totals		3.4	3.4

******* SENSOR PERFORMANCE BY RANGE ******

Unit: BTNK vs Unit: RTNK

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00
500- 999	.03	.03	.00
1000- 1499	.00	.00	.00
1500- 1999	.17	.17	.00
2000- 2499	.80	.80	.00
2500- 2999	1.47	1.47	.00
3000- 3499	3.10	3.10	.00
3500- 3999	14.93	14.93	.00
4000- 4499	.00	.00	.00

Unit: BTNK vs Unit: RAPC

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00
500- 999	.03	.03	.00
1000- 1499	.00	.00	.00
1500- 1999	.03	.03	.00
2000- 2499	.10	.10	.00
2500- 2999	.17	.17	.00
3000- 3499	.27	.27	.00
3500- 3999	2.37	2.37	.00
4000- 4499	.00	.00	.00

Unit: RTNK vs Unit: BTNK

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00
500- 999	.20	.20	.00
1000- 1499	.00	.00	.00
1500- 1999	.23	.23	.00
2000- 2499	1.27	.73	.53
2500- 2999	.93	.47	.47
3000- 3499	2.63	.60	2.03
3500- 3999	.60	.40	.20
4000- 4499	.00	.00	.00

Unit: RAPC vs Unit: BTNK

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00

500- 999	.03	.03	.00
1000- 1499	.00	.00	.00
1500- 1999	.03	.03	.00
2000- 2499	.07	.03	.03
2500- 2999	.20	.07	.13
3000- 3499	1.10	.07	1.03
3500- 3999	.30	.30	.00
4000- 4499	.00	.00	.00

***** FOV SENSOR PERFORMANCE BY RANGE *****

Unit: BTNK

	Tgts Actually Acquired			Tgts W-Acq, N-Failed	
Range Interval	#	Avg W Time	Avg N Time	#	Avg W Time
0- 499	.00	.00	.00	.00	.00
500- 999	.07	1.83	3.00	.00	.00
1000- 1499	.00	.00	.00	.00	.00
1500- 1999	.20	8.28	3.00	.00	.00
2000- 2499	.90	9.26	3.00	.03	.32
2500- 2999	1.63	7.83	3.00	.03	5.72
3000- 3499	3.37	7.44	3.00	.37	5.64
3500- 3999	17.30	6.43	3.00	.47	4.85
4000- 4499	.00	.00	.00	.00	.00
Totals	23.47	6.78	3.00	.90	5.04

Unit: RTNK

	Tgts Actually Acquired			Tgts W-Acq, N-Failed	
Range Interval	#	Avg W Time	Avg N Time	#	Avg W Time
0- 499	.00	.00	.00	.00	.00
500- 999	.20	7.15	3.00	.00	.00
1000- 1499	.00	.00	.00	.00	.00
1500- 1999	.23	10.73	3.00	.00	.00
2000- 2499	.73	8.61	3.00	.00	.00
2500- 2999	.47	7.39	3.00	.00	.00
3000- 3499	.60	9.89	3.00	.00	.00
3500- 3999	.40	8.46	3.00	.00	.00
4000- 4499	.00	.00	.00	.00	.00
Totals	2.63	8.74	3.00	.00	.00

Unit: RAPC

	Tgts Actually Acquired			Tgts W-Acq, N-Failed	
Range Interval	#	Avg W Time	Avg N Time	#	Avg W Time
0- 499	.00	.00	.00	.00	.00
500- 999	.03	10.02	3.00	.00	.00
1000- 1499	.00	.00	.00	.00	.00
1500- 1999	.03	19.46	3.00	.00	.00
2000- 2499	.03	18.84	3.00	.00	.00
2500- 2999	.07	12.45	3.00	.00	.00
3000- 3499	.07	12.32	3.00	.00	.00
3500- 3999	.30	5.68	3.00	.00	.00
4000- 4499	.00	.00	.00	.00	.00
Totals	.53	9.31	3.00	.00	.00

******* WEAPON PERFORMANCE BY RANGE ******

Unit/Weap: BTNK /BKE1		vs Unit: RTNK	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.13	.10	.03
1000- 1499	.00	.00	.00
1500- 1999	1.50	.53	.20
2000- 2499	9.80	1.50	.43
2500- 2999	17.50	2.23	.83
3000- 3499	20.63	1.97	.63
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.96	.87	.84
1000	.57	.66	.38
1500	.31	.54	.17
2000	.26	.54	.14
2500	.12	.49	.06
3000	.11	.48	.05
3500	.08	.44	.04
4000	.00	.00	.00

Unit/Weap: BTNK /		vs Unit: RTNK	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.13	.10	.03
1000- 1499	.00	.00	.00
1500- 1999	1.50	.53	.20
2000- 2499	9.80	1.50	.43
2500- 2999	17.50	2.23	.83
3000- 3499	20.63	1.97	.63
3500- 3999	.00	.00	.00

Unit/Weap: BTNK /BKE1		vs Unit: RAPC	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.40	.10	.03
2000- 2499	2.20	.33	.13
2500- 2999	1.53	.33	.13
3000- 3499	16.63	4.23	1.33
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.94	.87	.82
1000	.51	.66	.34
1500	.27	.54	.15
2000	.22	.54	.12
2500	.10	.49	.05
3000	.09	.48	.04
3500	.07	.44	.03
4000	.00	.00	.00

Unit/Weap: BTNK /		vs Unit: RAPC	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.40	.10	.03
2000- 2499	2.20	.33	.13
2500- 2999	1.53	.33	.13
3000- 3499	16.63	4.23	1.33
3500- 3999	.00	.00	.00

Unit/Weap: RTNK /RKE1		vs Unit: BTNK	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.37	.30	.07
1000- 1499	.00	.03	.00
1500- 1999	.60	.40	.10
2000- 2499	.67	.33	.13
2500- 2999	.13	.10	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.67	.66	.44
1000	.67	.66	.44
1500	.78	.66	.51
2000	.67	.65	.44
2500	.53	.58	.30
3000	.42	.52	.22

3000- 3499	.00	.00	.00	3500	.34	.47	.16
3500- 3999	.00	.00	.00	4000	.00	.00	.00

Unit/Weap: RTNK /RMI1		vs Unit: BTNK	
Range Interval |	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.27	.17	.10
2000- 2499	2.13	1.37	.70
2500- 2999	5.10	2.60	1.03
3000- 3499	7.60	2.63	1.00
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.61	.59	.36
1000	.55	.59	.33
1500	.76	.66	.50
2000	.64	.66	.43
2500	.51	.59	.30
3000	.40	.55	.22
3500	.32	.52	.17
4000	.00	.00	.00

Unit/Weap: RTNK /		vs Unit: BTNK	
Range Interval |	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.37	.30	.07
1000- 1499	.00	.03	.00
1500- 1999	.87	.57	.20
2000- 2499	2.80	1.70	.83
2500- 2999	5.23	2.70	1.03
3000- 3499	7.60	2.63	1.00
3500- 3999	.00	.00	.00

Unit/Weap: RAPC /RMI2		vs Unit: BTNK	
Range Interval |	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.03	.03	.00
1000- 1499	.00	.00	.00
1500- 1999	.03	.00	.00
2000- 2499	.07	.07	.03
2500- 2999	.40	.17	.07
3000- 3499	1.23	.57	.20
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.61	.59	.36
1000	.55	.59	.33
1500	.76	.66	.50
2000	.64	.66	.43
2500	.51	.59	.30
3000	.40	.55	.22
3500	.32	.52	.17
4000	.00	.00	.00

Unit/Weap: RAPC /		vs Unit: BTNK	
Range Interval |	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.03	.03	.00
1000- 1499	.00	.00	.00
1500- 1999	.03	.00	.00
2000- 2499	.07	.07	.03
2500- 2999	.40	.17	.07
3000- 3499	1.23	.57	.20
3500- 3999	.00	.00	.00

29.18 blue rnds consumed per red unit killed
14.72 red rnds consumed per blue unit killed

.00 avg num times each blue unit scheds a delayed emg firing
.00 avg num times each red unit scheds a delayed emg firing

.00 avg num times each blue unit fires a delayed emg round
.00 avg num times each red unit fires a delayed emg round

.00 avg extra time each blue unit scheds a delayed emg firing

```
.00 avg extra time each red  unit scheds a delayed emg firing

.00 avg extra time each blue unit fires a delayed emg round
.00 avg extra time each red  unit fires a delayed emg round
```

relative width statistics (95.% conf)

	mean	half length	lower bound	upper bound	reltv width	
blue dead	3.43	.29	3.14	3.73	.09	not good
red dead	3.77	.67	3.10	4.44	.18	not good
exch ratio	1.10	.43	.67	1.53	.39	not good
blue rnds	17.58	2.41	15.17	19.99	.14	not good
red rnds	3.11	.43	2.67	3.54	.14	not good

Thu Nov 19 14:35:42 est 1998

6.3 Event History

out
Thu Nov 19 14:36:21 est 1998

Sensor: BTNK Alpha*cl= .00

NFOV	RTNK		RAPC	
0	1.000	.00	1.000	.00
500	1.000	.42	1.000	.58
1000	1.000	.86	1.000	1.17
1500	1.000	1.31	1.000	1.79
2000	1.000	1.78	1.000	2.42
2500	1.000	2.26	.967	3.07
3000	.982	2.75	.915	3.74
3500	.955	3.26	.836	4.07
4000	.911	3.78	.738	4.61
WFOV				
0	1.000	.00	1.000	.00
500	1.000	2.34	1.000	3.27
1000	1.000	4.86	1.000	6.76
1500	1.000	7.54	1.000	10.46
2000	1.000	10.37	.996	14.33
2500	.997	13.33	.978	18.37
3000	.989	16.41	.936	22.68
3500	.968	19.69	.864	25.45
4000	.930	23.11	.767	28.66

Sensor: RTNK Alpha*cl= .00

NFOV	BTNK	
0	1.000	.00
500	1.000	.64
1000	1.000	1.29
1500	1.000	2.00
2000	.980	2.80
2500	.923	3.66
3000	.817	4.16

```
 3500      .690     4.93
 4000      .561     6.06
   WFOV
    0     1.000      .00
  500     1.000     3.56
 1000      .999     7.29
 1500      .972    11.56
 2000      .854    15.48
 2500      .644    20.54
 3000      .435    30.39
 3500      .294    44.90
 4000      .201    65.91

        Sensor:  RTNK     Alpha*cl=      .00
            BTNK
   NFOV
    0     1.000      .00
  500     1.000      .64
 1000     1.000     1.29
 1500     1.000     2.00
 2000      .980     2.80
 2500      .923     3.66
 3000      .817     4.16
 3500      .690     4.93
 4000      .561     6.06
   WFOV
    0     1.000      .00
  500     1.000     3.56
 1000      .999     7.29
 1500      .972    11.56
 2000      .854    15.48
 2500      .644    20.54
 3000      .435    30.39
 3500      .294    44.90
 4000      .201    65.91
TNK     1     y= 4000.     speed=   .0m/s     exposure=FE
TNK     2     y= 4000.     speed=   .0m/s     exposure=FE
TNK     3     y= 4000.     speed=   .0m/s     exposure=FE
TNK     4     y= 4000.     speed=   .0m/s     exposure=FE
TNK     5     y=    0.     speed=  3.3m/s     exposure=FE
TNK     6     y=    0.     speed=  3.3m/s     exposure=FE
TNK     7     y=    0.     speed=  3.3m/s     exposure=FE
TNK     8     y=    0.     speed=  3.3m/s     exposure=FE
APC     9     y=  100.     speed=  3.3m/s     exposure=FE
APC    10     y=  100.     speed=  3.3m/s     exposure=FE
    .00 red   5 and blue  1 begin the game in-vu.
    .00 blue  1 fails field-of-view search against red   5
    .00 red   5 fails field-of-view search against blue  1
    .00 red   6 and blue  1 begin the game in-vu.
    .00 blue  1 fails field-of-view search against red   6
    .00 red   6 fails field-of-view search against blue  1
    .00 red   7 and blue  1 begin the game in-vu.
    .00 blue  1 fails field-of-view search against red   7
    .00 red   7 fails field-of-view search against blue  1
    .00 red   8 and blue  1 begin the game in-vu.
    .00 blue  1 fails field-of-view search against red   8
    .00 red   8 fails field-of-view search against blue  1
    .00 red   9 and blue  1 begin the game in-vu.
    .00 blue  1 fails field-of-view search against red   9
    .00 red   9 fails field-of-view search against blue  1
    .00 red  10 and blue  1 begin the game in-vu.
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   .00 blue  1 fails field-of-view search against red  10
   .00 red  10 fails field-of-view search against blue  1
   .00 red   5 and blue  2 begin the game in-vu.
   .00 blue  2 fails field-of-view search against red   5
   .00 red   5 fails field-of-view search against blue  2
   .00 red   6 and blue  2 begin the game in-vu.
   .00 blue  2 fails field-of-view search against red   6
   .00 red   6 fails field-of-view search against blue  2
   .00 red   7 and blue  2 begin the game in-vu.
   .00 blue  2 fails field-of-view search against red   7
   .00 red   7 fails field-of-view search against blue  2
   .00 red   8 and blue  2 begin the game in-vu.
   .00 blue  2 fails field-of-view search against red   8
   .00 red   8 fails field-of-view search against blue  2
   .00 red   9 and blue  2 begin the game in-vu.
   .00 blue  2 fails field-of-view search against red   9
   .00 red   9 fails field-of-view search against blue  2
   .00 red  10 and blue  2 begin the game in-vu.
   .00 blue  2 fails field-of-view search against red  10
   .00 red  10 fails field-of-view search against blue  2
   .00 red   5 and blue  3 begin the game in-vu.
   .00 red   5 fails field-of-view search against blue  3
 11.65 blue  3 sees red   5 and switches to narrow search #dets( 3)= 1 0
 14.65 blue   3 detects red    5 but cannot ID (regu); #dets= 1 1 rng= 3951.
 14.65 blue  3 has no appropriate weapon to fire at red   5 at range   3951.2
 14.65 blue  3 cannot select outside firmax: ncantf=   1
       armyf   firer  target       range      firmax
         1       3       5      3951.2       3500.
 14.65 blue  3 dis-engs red   5 because he has no chance to engage #dets= 0 0
 22.93 blue  3 sees red   5 and switches to narrow search #dets( 3)= 1 0
 25.93 blue   3 detects red    5 but cannot ID (regu); #dets= 1 1 rng= 3914.
 25.93 blue  3 has no appropriate weapon to fire at red   5 at range   3913.6
 25.93 blue  3 cannot select outside firmax: ncantf=   2
       armyf   firer  target       range      firmax
         1       3       5      3913.6       3500.
 25.93 blue  3 dis-engs red   5 because he has no chance to engage #dets= 0 0
 28.51 blue  3 sees red   5 and switches to narrow search #dets( 3)= 1 0
 31.51 blue   3 detects red    5 but cannot ID (regu); #dets= 1 1 rng= 3895.
 31.51 blue  3 has no appropriate weapon to fire at red   5 at range   3895.0
 31.51 blue  3 cannot select outside firmax: ncantf=   3
       armyf   firer  target       range      firmax
         1       3       5      3895.0       3500.
 31.51 blue  3 dis-engs red   5 because he has no chance to engage #dets= 0 0
 56.27 blue  3 sees red   5 and switches to narrow search #dets( 3)= 1 0
 59.27 blue   3 detects red    5 but cannot ID (regu); #dets= 1 1 rng= 3802.
 59.27 blue  3 has no appropriate weapon to fire at red   5 at range   3802.4
 59.27 blue  3 cannot select outside firmax: ncantf=   4
       armyf   firer  target       range      firmax
         1       3       5      3802.4       3500.
 59.27 blue  3 dis-engs red   5 because he has no chance to engage #dets= 0 0
210.08 blue  1 sees red   8 and switches to narrow search #dets( 1)= 1 0
210.58 blue  2 sees red   6 and switches to narrow search #dets( 2)= 1 0
213.08 blue   1 detects red    8 but cannot ID (regu); #dets= 1 1 rng= 3290.
213.08 blue  1 chooses weapon BKE1    to fire at red   8 at range   3289.8
213.08 blue  1 selects red   8 with priority   14  #dets= 1 1 #tgts= 1
213.58 blue   2 detects red    6 but cannot ID (regu); #dets= 1 1 rng= 3288.
213.58 blue  2 chooses weapon BKE1    to fire at red   6 at range   3288.1
213.58 blue  2 selects red   6 with priority   14  #dets= 1 1 #tgts= 1
220.33 blue  1 lases red   8 to get range
223.81 blue  2 lases red   6 to get range
223.94 blue  1 fires BKE1    at red   8
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225.94 blue  1 (BKE1   ) misses   red   8 & loses round.   rnd#=  1
228.03 blue  2 fires BKE1    at red   6
229.83 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  1
235.46 blue  1 fires BKE1    at red   8
237.26 blue  1 (BKE1   ) hits red   8 but doesn't kill it.  rnd#=  2
246.41 blue  2 fires BKE1    at red   6
248.21 blue  2 (BKE1   )  m-kills red   6         range = 3172.72  rnd#=  2
248.21 red   6 is moved from group  6 to group  7
248.21 red   6 brakes           (was cruising)
249.87 red   6 halts            range =3173. meters
262.16 blue  1 fires BKE1    at red   8
263.80 blue  2 fires BKE1    at red   6
263.80 red   6 sees blue  2 muzzle flash and tries to detect
263.96 blue  1 (BKE1   ) misses   red   8 & loses round.   rnd#=  3
265.60 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  3
265.87 blue  1 fires BKE1    at red   8
265.87 red   9 sees blue  1 muzzle flash and tries to detect
267.67 blue  1 (BKE1   ) mf-kills red   8         range = 3107.85  rnd#=  4
267.67 red   8 is moved from group  6 to group  8
267.67 red   8 brakes           (was cruising)
268.18 red    6 detects blue   2 but cannot ID (pinp); #dets= 1 1 rng= 3173.
268.18 red   6 chooses weapon RMI1    to fire at blue  2 at range   3172.7
268.18 red   6 selects blue  2 with priority    9  #dets= 1 1 #tgts= 1
269.34 red   8 halts            range =3108. meters
269.44 blue  1 fires BKE1    at red   8
271.24 blue  1 (BKE1   ) mf-kills red   8         range = 3107.85  rnd#=  5
275.80 blue  2 fires BKE1    at red   6
275.80 red   9 sees blue  2 muzzle flash and tries to detect
277.60 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  4
279.72 red    9 detects blue   2 but cannot ID (pinp); #dets= 1 1 rng= 2968.
279.72 red   9 chooses weapon RMI2    to fire at blue  2 at range   2967.7
279.72 red   9 selects blue  2 with priority    9  #dets= 1 1 #tgts= 1
279.72 red   9 brakes           (was cruising)
281.39 red   9 halts            range =2968. meters
282.93 blue  1 fires BKE1    at red   8
282.94 blue  2 fires BKE1    at red   6
282.94 red  10 sees blue  2 muzzle flash and tries to detect
283.95 red   6 fires RMI1    at blue  2
284.73 blue  1 (BKE1   ) misses   red   8 & loses round.   rnd#=  6
284.74 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  5
285.67 red   10 detects blue   2 but cannot ID (pinp); #dets= 1 1 rng= 2948.
285.67 red  10 chooses weapon RMI2    to fire at blue  2 at range   2947.9
285.67 red  10 selects blue  2 with priority    9  #dets= 1 1 #tgts= 1
285.67 red  10 brakes           (was cruising)
287.34 red  10 halts            range =2948. meters
288.00 blue  2 fires BKE1    at red   6
289.05 red   9 fires RMI2    at blue  2
289.80 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  6
294.11 blue  1 fires BKE1    at red   8
295.91 blue  1 (BKE1   ) hits red   8 but doesn't kill it.  rnd#=  7
295.91 red   8 i-killed.
295.91 blue  1 leaves red   8 after tgt is killed #dets=  1  1 #tgts= 1
296.99 blue  2 fires BKE1    at red   6
297.95 red   6 (RMI1   ) misses   blue  2 & loses round.   rnd#=  1
298.79 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  7
298.90 blue  2 fires BKE1    at red   6
300.70 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  8
303.05 red   9 (RMI2   ) misses   blue  2 & loses round.   rnd#=  1
303.30 red   6 fires RMI1    at blue  2
305.28 red  10 fires RMI2    at blue  2
307.40 blue  1 sees red   6 and switches to narrow search #dets( 1)= 1 0
```

```
310.40 blue   1 detects red    6 but cannot ID (regu); #dets= 1 1 rng= 3173.
310.40 blue  1 chooses weapon BKE1    to fire at red   6 at range   3172.7
310.40 blue  1 selects red   6 with priority    9  #dets= 1 1 #tgts= 1
311.39 red   9 fires RMI2    at blue  2
317.11 blue  2 fires BKE1    at red   6
317.30 red   6 (RMI1   ) mf-kills blue  2         range = 3172.72  rnd#=  2
318.91 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  9
319.28 red  10 (RMI2   ) misses   blue  2 & loses round.   rnd#=  1
325.39 red   9 (RMI2   ) mf-kills blue  2         range = 2967.68  rnd#=  2
325.39 red   9 begins to reload, fully exposed
326.05 blue  1 lases red   6 to get range
326.83 red  10 fires RMI2    at blue  2
328.14 blue  1 fires BKE1    at red   6
329.94 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#=  8
329.97 red   6 fires RMI1    at blue  2
333.52 red   5 appears for  blue  4
333.52 red   5 fails field-of-view search against blue  4
335.59 blue  1 fires BKE1    at red   6
337.39 blue  1 (BKE1   ) hits red   6 but doesn't kill it.  rnd#=  9
340.83 red  10 (RMI2   ) misses   blue  2 & loses round.   rnd#=  2
340.83 red  10 begins to reload, fully exposed
340.95 blue  1 fires BKE1    at red   6
342.26 blue  3 sees red   5 and switches to narrow search #dets( 3)= 1 0
342.43 blue  4 sees red   5 and switches to narrow search #dets( 4)= 1 0
342.75 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 10
343.97 red   6 (RMI1   )  m-kills blue  2         range = 3172.72  rnd#=  3
345.26 blue   3 detects red    5 but cannot ID (regu); #dets= 1 1 rng= 2849.
345.26 blue  3 chooses weapon BKE1    to fire at red   5 at range   2849.3
345.26 blue  3 selects red   5 with priority   14  #dets= 1 1 #tgts= 1
345.43 blue   4 detects red    5 but cannot ID (regu); #dets= 1 1 rng= 2849.
345.43 blue  4 chooses weapon BKE1    to fire at red   5 at range   2848.7
345.43 blue  4 selects red   5 with priority   14  #dets= 1 1 #tgts= 1
347.30 blue  2 i-killed.
347.30 red   6 leaves blue  2 after tgt is killed #dets=  1  1 #tgts= 1
347.30 red   9 leaves blue  2 after tgt is killed #dets=  1  1 #tgts= 1
347.30 red  10 leaves blue  2 after tgt is killed #dets=  1  1 #tgts= 1
347.33 blue  3 lases red   5 to get range
350.89 blue  3 fires BKE1    at red   5
351.17 blue  1 fires BKE1    at red   6
352.69 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  1
352.97 blue  1 (BKE1   ) hits red   6 but doesn't kill it.  rnd#= 11
355.26 blue  4 lases red   5 to get range
355.39 red   9 finishes reloading
355.39 red   9 accelerates from stationary
357.72 blue  3 fires BKE1    at red   5
358.31 blue  4 fires BKE1    at red   5
358.72 red   9 at full speed.
359.52 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  2
360.11 blue  4 (BKE1   ) hits red   5 but doesn't kill it.  rnd#=  1
366.71 blue  3 fires BKE1    at red   5
368.51 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  3
370.48 blue  4 fires BKE1    at red   5
370.83 red  10 finishes reloading
370.83 red  10 accelerates from stationary
372.28 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  2
373.91 blue  3 fires BKE1    at red   5
374.16 red  10 at full speed.
375.71 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  4
377.91 blue  4 fires BKE1    at red   5
379.31 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  3
386.17 blue  4 fires BKE1    at red   5
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386.97 blue  3 fires BKE1    at red   5
387.57 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  4
388.37 blue  3 (BKE1   ) hits red   5 but doesn't kill it.  rnd#=  5
388.37 blue  1 fires BKE1    at red   6
388.41 red   7 appears for  blue  4
388.41 red   7 fails field-of-view search against blue  4
390.17 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 12
392.20 blue  3 fires BKE1    at red   5
393.60 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  6
397.97 blue  4 fires BKE1    at red   5
399.37 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  5
399.76 blue  3 fires BKE1    at red   5
400.45 blue  1 fires BKE1    at red   6
400.45 red  10 sees blue  1 muzzle flash and tries to detect
401.16 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  7
402.25 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 13
402.66 red   7 appears for  blue  3
402.66 red   7 fails field-of-view search against blue  3
403.59 red   10 detects blue   1 but cannot ID (pinp); #dets= 1 1 rng= 2844.
403.59 red  10 chooses weapon RMI2    to fire at blue  1 at range   2844.2
403.59 red  10 selects blue  1 with priority    9  #dets= 1 1 #tgts= 1
403.59 red  10 brakes           (was cruising)
405.26 red  10 halts            range =2844. meters
407.44 blue  3 fires BKE1    at red   5
408.84 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  8
412.12 blue  1 fires BKE1    at red   6
413.92 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 14
416.71 red  10 fires RMI2    at blue  1
422.10 blue  1 fires BKE1    at red   6
422.62 blue  3 fires BKE1    at red   5
423.90 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 15
424.02 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  9
428.89 blue  4 fires BKE1    at red   5
430.29 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  6
430.71 red  10 (RMI2   ) misses   blue  1 & loses round.   rnd#=  3
436.07 red  10 fires RMI2    at blue  1
438.10 blue  4 fires BKE1    at red   5
438.41 blue  1 fires BKE1    at red   6
439.50 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  7
440.21 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 16
440.38 blue  3 fires BKE1    at red   5
441.78 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#= 10
447.00 blue  1 fires BKE1    at red   6
448.80 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 17
450.07 red  10 (RMI2   ) misses   blue  1 & loses round.   rnd#=  4
450.07 red  10 begins to reload, fully exposed
450.10 blue  4 fires BKE1    at red   5
451.50 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  8
452.79 blue  3 fires BKE1    at red   5
454.19 blue  3 (BKE1   ) hits red   5 but doesn't kill it.  rnd#= 11
457.36 blue  4 fires BKE1    at red   5
458.76 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  9
460.85 blue  3 fires BKE1    at red   5
462.25 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#= 12
465.74 red   9 appears for  blue  4
465.74 red   9 fails field-of-view search against blue  4
470.36 blue  3 fires BKE1    at red   5
471.76 blue  3 (BKE1   )  k-kills red   5          range = 2427.62  rnd#= 13
471.76 blue  3 leaves red   5 after tgt is killed #dets=  1  1 #tgts= 1
471.76 blue  4 leaves red   5 after tgt is killed #dets=  1  1 #tgts= 1
471.76 red   5 brakes           (was cruising)
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```
472.88 blue  4 sees red   9 and switches to narrow search #dets( 4)= 1 0
473.43 red   5 halts            range =2428. meters
475.88 blue   4 detects red    9 but cannot ID (regu); #dets= 1 1 rng= 2572.
475.88 blue  4 chooses weapon BKE1    to fire at red   9 at range   2571.6
475.88 blue  4 selects red   9 with priority   14  #dets= 1 1 #tgts= 1
476.84 blue  1 fires BKE1    at red   6
478.64 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 18
479.99 red   9 appears for  blue  3
479.99 red   9 fails field-of-view search against blue  3
480.07 red  10 finishes reloading
480.07 red  10 fires RMI2    at blue  1
482.30 blue  3 sees red   9 and switches to narrow search #dets( 3)= 1 0
485.30 blue   3 detects red    9 but cannot ID (regu); #dets= 1 1 rng= 2540.
485.30 blue  3 chooses weapon BKE1    to fire at red   9 at range   2540.2
485.30 blue  3 selects red   9 with priority   14  #dets= 1 1 #tgts= 1
487.33 blue  4 lases red   9 to get range
488.91 blue  4 fires BKE1    at red   9
490.31 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 10
490.85 blue  3 lases red   9 to get range
492.37 blue  1 fires BKE1    at red   6
493.17 blue  3 fires BKE1    at red   9
494.07 red  10 (RMI2   ) dud hits blue  1
494.17 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 19
494.57 blue  3 (BKE1   ) hits red   9 but doesn't kill it.  rnd#= 14
500.21 blue  4 fires BKE1    at red   9
500.37 blue  1 fires BKE1    at red   6
501.61 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 11
501.89 red  10 fires RMI2    at blue  1
502.17 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 20
504.58 blue  3 fires BKE1    at red   9
505.98 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 15
507.88 blue  1 fires BKE1    at red   6
509.68 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 21
509.86 blue  4 fires BKE1    at red   9
511.26 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 12
514.45 blue  3 fires BKE1    at red   9
515.85 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 16
515.89 red  10 (RMI2   ) misses   blue  1 & loses round.   rnd#=  6
515.89 red  10 begins to reload, fully exposed
516.62 blue  1 fires BKE1    at red   6
518.42 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 22
524.18 blue  3 fires BKE1    at red   9
525.58 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 17
526.40 blue  4 fires BKE1    at red   9
527.80 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 13
529.62 blue  3 fires BKE1    at red   9
531.02 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 18
535.34 blue  4 fires BKE1    at red   9
536.34 blue  3 fires BKE1    at red   9
536.74 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 14
537.74 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 19
538.73 blue  1 fires BKE1    at red   6
539.94 blue  4 fires BKE1    at red   9
540.53 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 23
541.34 blue  4 (BKE1   ) hits red   9 but doesn't kill it.  rnd#= 15
542.92 blue  1 fires BKE1    at red   6
544.72 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 24
545.89 red  10 finishes reloading
545.89 red  10 fires RMI2    at blue  1
549.47 blue  1 fires BKE1    at red   6
551.27 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 25
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558.47 blue  4 fires BKE1    at red   9
559.87 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 16
559.89 red  10 (RMI2   ) misses   blue  1 & loses round.   rnd#=  7
560.20 blue  3 fires BKE1    at red   9
560.20 red   7 sees blue  3 muzzle flash and tries to detect
561.60 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 20
562.68 red    7 detects blue   3 but cannot ID (pinp); #dets= 1 1 rng= 2125.
562.68 red   7 chooses weapon RMI1    to fire at blue  3 at range   2124.6
562.68 red   7 selects blue  3 with priority    9  #dets= 1 1 #tgts= 1
562.97 blue  1 fires BKE1    at red   6
564.77 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 26
567.20 blue  3 fires BKE1    at red   9
568.60 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 21
568.65 blue  4 fires BKE1    at red   9
570.05 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 17
572.46 blue  3 fires BKE1    at red   9
572.49 red   7 fires RMI1    at blue  3
573.46 blue  3 (BKE1   ) mf-kills red   9         range = 2246.39  rnd#= 22
573.46 red   9 is moved from group  6 to group  9
573.46 red   9 brakes            (was cruising)
574.14 blue  1 fires BKE1    at red   6
575.13 red   9 halts             range =2246. meters
575.94 blue  1 (BKE1   ) mf-kills red   6         range = 3172.72  rnd#= 27
579.12 blue  4 fires BKE1    at red   9
579.53 blue  3 fires BKE1    at red   9
580.12 blue  4 (BKE1   )  k-kills red   9         range = 2246.39  rnd#= 18
580.12 blue  3 leaves red   9 after tgt is killed #dets=  1  1 #tgts= 1
580.12 blue  4 leaves red   9 after tgt is killed #dets=  1  1 #tgts= 1
580.53 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 23
581.95 blue  4 sees red   7 and switches to narrow search #dets( 4)= 1 0
582.49 red   7 (RMI1   )  k-kills blue  3         range = 2058.56  rnd#=  1
582.49 red   7 leaves blue  3 after tgt is killed #dets=  1  1 #tgts= 1
583.66 red  10 fires RMI2    at blue  1
584.95 blue   4 detects red    7 but cannot ID (regu); #dets= 1 1 rng= 2050.
584.95 blue  4 chooses weapon BKE1    to fire at red   7 at range   2050.3
584.95 blue  4 selects red   7 with priority    9  #dets= 1 1 #tgts= 1
586.59 blue  1 fires BKE1    at red   6
588.39 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 28
588.64 blue  4 lases red   7 to get range
592.53 blue  4 fires BKE1    at red   7
593.53 blue  4 (BKE1   )  m-kills red   7         range = 2021.78  rnd#= 19
593.53 red   7 is moved from group  6 to group 10
593.53 red   7 brakes            (was cruising)
593.70 blue  1 fires BKE1    at red   6
595.19 red   7 halts             range =2022. meters
595.50 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 29
596.82 blue  4 fires BKE1    at red   7
597.66 red  10 (RMI2   ) mf-kills blue  1         range = 2844.22  rnd#=  8
597.66 red  10 dis-engs blue  1 because current weapon empty       #dets= 0 0
597.82 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 20
602.66 blue  4 fires BKE1    at red   7
603.66 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 21
605.94 red   6 i-killed.
612.50 blue  4 fires BKE1    at red   7
613.50 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 22
626.64 blue  4 fires BKE1    at red   7
627.64 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 23
627.66 blue  1 i-killed.
636.64 blue  4 fires BKE1    at red   7
637.64 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 24
641.11 blue  4 fires BKE1    at red   7
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642.11 blue  4 (BKE1   ) hits red   7 but doesn't kill it.  rnd#= 25
648.43 blue  4 fires BKE1    at red   7
649.43 blue  4 (BKE1   ) misses   red   7 & loses round.    rnd#= 26
659.92 blue  4 fires BKE1    at red   7
660.92 blue  4 (BKE1   ) misses   red   7 & loses round.    rnd#= 27
678.05 blue  4 fires BKE1    at red   7
679.05 blue  4 (BKE1   ) misses   red   7 & loses round.    rnd#= 28
683.64 blue  4 fires BKE1    at red   7
684.64 blue  4 (BKE1   ) misses   red   7 & loses round.    rnd#= 29
691.06 blue  4 fires BKE1    at red   7
692.06 blue  4 (BKE1   ) misses   red   7 & loses round.    rnd#= 30
702.06 blue  4 fires BKE1    at red   7
703.06 blue  4 (BKE1   ) misses   red   7 & loses round.    rnd#= 31
707.93 blue  4 fires BKE1    at red   7
708.93 blue  4 (BKE1   ) misses   red   7 & loses round.    rnd#= 32
712.97 blue  4 fires BKE1    at red   7
713.97 blue  4 (BKE1   ) misses   red   7 & loses round.    rnd#= 33
726.19 blue  4 fires BKE1    at red   7
727.19 blue  4 (BKE1   ) misses   red   7 & loses round.    rnd#= 34
735.85 blue  4 fires BKE1    at red   7
736.85 blue  4 (BKE1   ) misses   red   7 & loses round.    rnd#= 35
744.60 blue  4 fires BKE1    at red   7
745.60 blue  4 (BKE1   ) misses   red   7 & loses round.    rnd#= 36
756.15 blue  4 fires BKE1    at red   7
757.15 blue  4 (BKE1   ) misses   red   7 & loses round.    rnd#= 37
770.89 blue  4 fires BKE1    at red   7
771.89 blue  4 (BKE1   ) misses   red   7 & loses round.    rnd#= 38
777.25 blue  4 fires BKE1    at red   7
778.25 blue  4 (BKE1   )  k-kills red   7          range = 2021.78  rnd#= 39
778.25 blue  4 leaves red   7 after tgt is killed #dets=  1   1 #tgts= 1
```

status of combatants										average rounds used per sys		Seeds for next rep	
|----blue----|					|----red-----|							
rep	al	mo	fo	mf	k	al	mo	fo	mf	k	blue	red	general	LOS
1	1	0	0	2	1	1	0	0	2	3	25.0	2.3	1223423358	1384844454

GROUNDWARS 6.52

INITIAL CONDITIONS:

Scenario: Red Attack
Terrain: Al Mafraq
Attack Distribution: Frontal

Atmospheric Conditions:
10.0 km. visibility
Pinpoint Restrictions: Only if p-infinity > 0

Replications: 1
Game range: 4000 meters
Max Time: 1050.0 seconds

Number	Unit Name	Vehicle Name	Weapon1 Name	Weapon2 Name	Weapon3 Name	Sensor Name
4	BTNK	BTNK	BKE1	NULL	NULL	BTNK
4	RTNK	RTNK	RKE1	RMI1	NULL	RTNK
2	RAPC	RAPC	RMI2	NULL	NULL	RTNK

RESULTS:

1.67 exchange ratio
1.00 surviving force ratio

*** Average Losses by Direct Fire ***

	Enemy	Friendly
Red Losses	5.00	.00
Blue Losses	3.00	.00

***** System Exchange Ratios *****
(vehicles killed per vehicle lost)

BTNK	1.67
RTNK	.50
RAPC	1.00

***** Killer - Victim Scoreboard (Kills) *****

Killers | Victims-->	BTNK	RTNK	RAPC	Total
BTNK	.00	4.00	1.00	5.00
RTNK	2.00	.00	.00	2.00
RAPC	1.00	.00	.00	1.00
Pr. Art	.00	.00	.00	
On-call	.00	.00	.00	
Total Killed ->	3.00	4.00	1.00	

Average Status of Combatants (Dead/Total)

	Alive	M-Dead	F-Dead	M&F-Dead	DEAD
BTNK	25.0	.0	.0	50.0	25.0
RTNK	.0	.0	.0	50.0	50.0
RAPC	50.0	.0	.0	.0	50.0

Losses as a Function of Time

Time Interval	RED Dead	BLUE Dead	Exchange Ratio
0- 60	.00	.00	.00
60- 120	.00	.00	.00
120- 180	.00	.00	.00
180- 240	.00	.00	.00
240- 300	1.00	.00	.00
300- 360	1.00	1.00	1.00
360- 420	1.00	1.00	1.00
420- 480	2.00	1.00	2.00
480- 540	2.00	1.00	2.00
540- 600	4.00	3.00	1.33
600- 660	4.00	3.00	1.33
660- 720	4.00	3.00	1.33
720- 780	5.00	3.00	1.67
780- 840	5.00	3.00	1.67
840- 900	5.00	3.00	1.67
900- 960	5.00	3.00	1.67
960- 1020	5.00	3.00	1.67
1020- 1080	5.00	3.00	1.67

****
********** BLUE Force Performance **********
****

******* Sensor Performance *******

TARGETS -->	RTNK		RAPC		Total	
OBSERVERS	Reg.	Pinp.	Reg.	Pinp.	Reg.	Pinp.
BTNK	10.0	.0	2.0	.0	12.0	.0
Totals	10.0	.0	2.0	.0	12.0	.0

******* Weapon Performance *******

******** SHOTS ********

TARGETS -->		RTNK	RAPC	Total
BTNK	BKE1	81.0	19.0	100.0
BTNK		81.0	19.0	100.0
Totals		81.0	19.0	100.0

******** HITS ********

TARGETS -->		RTNK	RAPC	Total
BTNK	BKE1	15.0	4.0	19.0
BTNK		15.0	4.0	19.0
Totals		15.0	4.0	19.0

******** KILLS ********

TARGETS -->		RTNK	RAPC	Total
BTNK	BKE1	4.0	1.0	5.0
BTNK		4.0	1.0	5.0
Totals		4.0	1.0	5.0

****
********** RED Force Performance **********
****

******* Sensor Performance *******

TARGETS -->	BTNK		Total	
OBSERVERS	Reg.	Pinp.	Reg.	Pinp.
RTNK	.0	2.0	.0	2.0
RAPC	.0	3.0	.0	3.0
Totals	.0	5.0	.0	5.0

******* Weapon Performance *******

******** SHOTS ********

TARGETS -->		BTNK	Total
RTNK	RKE1	.0	.0
RTNK	RMI1	4.0	4.0
RTNK		4.0	4.0
RAPC	RMI2	10.0	10.0
RAPC		10.0	10.0
Totals		14.0	14.0

******** HITS ********

TARGETS -->		BTNK	Total
RTNK	RKE1	.0	.0
RTNK	RMI1	3.0	3.0
RTNK		3.0	3.0
RAPC	RMI2	3.0	3.0
RAPC		3.0	3.0
Totals		6.0	6.0

******** KILLS ********

TARGETS -->		BTNK	Total
RTNK	RKE1	.0	.0
RTNK	RMI1	2.0	2.0
RTNK		2.0	2.0
RAPC	RMI2	1.0	1.0
RAPC		1.0	1.0
Totals		3.0	3.0

******* SENSOR PERFORMANCE BY RANGE ******

Unit: BTNK vs Unit: RTNK

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	1.00	1.00	.00
2500- 2999	2.00	2.00	.00
3000- 3499	3.00	3.00	.00
3500- 3999	4.00	4.00	.00
4000- 4499	.00	.00	.00

Unit: BTNK vs Unit: RAPC

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	.00	.00	.00
2500- 2999	2.00	2.00	.00
3000- 3499	.00	.00	.00
3500- 3999	.00	.00	.00
4000- 4499	.00	.00	.00

Unit: RTNK vs Unit: BTNK

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	1.00	.00	1.00
2500- 2999	.00	.00	.00
3000- 3499	1.00	.00	1.00
3500- 3999	.00	.00	.00

4000- 4499	.00	.00	.00

Unit: RAPC vs Unit: BTNK

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	.00	.00	.00
2500- 2999	3.00	.00	3.00
3000- 3499	.00	.00	.00
3500- 3999	.00	.00	.00
4000- 4499	.00	.00	.00

***** FOV SENSOR PERFORMANCE BY RANGE *****

Unit: BTNK

	Tgts Actually Acquired			Tgts W-Acq, N-Failed	
Range Interval	#	Avg W Time	Avg N Time	#	Avg W Time
0- 499	.00	.00	.00	.00	.00
500- 999	.00	.00	.00	.00	.00
1000- 1499	.00	.00	.00	.00	.00
1500- 1999	.00	.00	.00	.00	.00
2000- 2499	1.00	1.84	3.00	.00	.00
2500- 2999	4.00	21.33	3.00	.00	.00
3000- 3499	3.00	4.04	3.00	.00	.00
3500- 3999	4.00	11.82	3.00	.00	.00
4000- 4499	.00	.00	.00	.00	.00
Totals	12.00	12.21	3.00	.00	.00

******* WEAPON PERFORMANCE BY RANGE ******

Unit/Weap: BTNK /BKE1 vs Unit: RTNK

Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	26.00	5.00	2.00
2500- 2999	17.00	2.00	.00
3000- 3499	38.00	8.00	2.00
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.96	.87	.84
1000	.57	.66	.38
1500	.31	.54	.17
2000	.26	.54	.14
2500	.12	.49	.06
3000	.11	.48	.05
3500	.08	.44	.04
4000	.00	.00	.00

Unit/Weap: BTNK / vs Unit: RTNK

Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	26.00	5.00	2.00
2500- 2999	17.00	2.00	.00
3000- 3499	38.00	8.00	2.00

3500- 3999	.00	.00	.00

Unit/Weap: BTNK / BKE1		vs Unit: RAPC	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	17.00	3.00	1.00
2500- 2999	2.00	1.00	.00
3000- 3499	.00	.00	.00
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.94	.87	.82
1000	.51	.66	.34
1500	.27	.54	.15
2000	.22	.54	.12
2500	.10	.49	.05
3000	.09	.48	.04
3500	.07	.44	.03
4000	.00	.00	.00

Unit/Weap: BTNK /		vs Unit: RAPC	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	17.00	3.00	1.00
2500- 2999	2.00	1.00	.00
3000- 3499	.00	.00	.00
3500- 3999	.00	.00	.00

Unit/Weap: RTNK / RMI1		vs Unit: BTNK	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	1.00	1.00	1.00
2500- 2999	.00	.00	.00
3000- 3499	3.00	2.00	1.00
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.61	.59	.36
1000	.55	.59	.33
1500	.76	.66	.50
2000	.64	.66	.43
2500	.51	.59	.30
3000	.40	.55	.22
3500	.32	.52	.17
4000	.00	.00	.00

Unit/Weap: RTNK /		vs Unit: BTNK	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	1.00	1.00	1.00
2500- 2999	.00	.00	.00
3000- 3499	3.00	2.00	1.00
3500- 3999	.00	.00	.00

Unit/Weap: RAPC /RMI2		vs Unit: BTNK	
Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	.00	.00	.00
2500- 2999	10.00	3.00	1.00
3000- 3499	.00	.00	.00
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.61	.59	.36
1000	.55	.59	.33
1500	.76	.66	.50
2000	.64	.66	.43
2500	.51	.59	.30
3000	.40	.55	.22
3500	.32	.52	.17
4000	.00	.00	.00

```
Unit/Weap: RAPC    /          vs Unit: BTNK
Range Interval |   Shots     Hits    Kills
      0-  499        .00      .00      .00
    500-  999        .00      .00      .00
   1000- 1499        .00      .00      .00
   1500- 1999        .00      .00      .00
   2000- 2499        .00      .00      .00
   2500- 2999      10.00     3.00     1.00
   3000- 3499        .00      .00      .00
   3500- 3999        .00      .00      .00

   24.40 blue rnds consumed per red unit killed
   38.33 red rnds consumed per blue unit killed

     .00 avg num times each blue unit scheds a delayed emg firing
     .00 avg num times each red  unit scheds a delayed emg firing

     .00 avg num times each blue unit fires a delayed emg round
     .00 avg num times each red  unit fires a delayed emg round

     .00 avg extra time each blue unit scheds a delayed emg firing
     .00 avg extra time each red  unit scheds a delayed emg firing

     .00 avg extra time each blue unit fires a delayed emg round
     .00 avg extra time each red  unit fires a delayed emg round

Thu Nov 19 14:36:25 est 1998
```

6.4 Event-Queue Scheduling and Canceling

```
out
Thu Nov 19 14:36:48 est 1998

         Sensor:  BTNK      Alpha*cl=      .00
             RTNK              RAPC
   NFOV
     0    1.000      .00    1.000      .00
   500    1.000      .42    1.000      .58
  1000    1.000      .86    1.000     1.17
  1500    1.000     1.31    1.000     1.79
  2000    1.000     1.78    1.000     2.42
  2500    1.000     2.26     .967     3.07
  3000     .982     2.75     .915     3.74
  3500     .955     3.26     .836     4.07
  4000     .911     3.78     .738     4.61
   WFOV
     0    1.000      .00    1.000      .00
   500    1.000     2.34    1.000     3.27
  1000    1.000     4.86    1.000     6.76
  1500    1.000     7.54    1.000    10.46
  2000    1.000    10.37     .996    14.33
  2500     .997    13.33     .978    18.37
  3000     .989    16.41     .936    22.68
  3500     .968    19.69     .864    25.45
  4000     .930    23.11     .767    28.66

         Sensor:  RTNK      Alpha*cl=      .00
```

```
            BTNK
   NFOV
      0    1.000     .00
    500    1.000     .64
   1000    1.000    1.29
   1500    1.000    2.00
   2000     .980    2.80
   2500     .923    3.66
   3000     .817    4.16
   3500     .690    4.93
   4000     .561    6.06
    WFOV
      0    1.000     .00
    500    1.000    3.56
   1000     .999    7.29
   1500     .972   11.56
   2000     .854   15.48
   2500     .644   20.54
   3000     .435   30.39
   3500     .294   44.90
   4000     .201   65.91

         Sensor:  RTNK     Alpha*cl=      .00
             BTNK
   NFOV
      0    1.000     .00
    500    1.000     .64
   1000    1.000    1.29
   1500    1.000    2.00
   2000     .980    2.80
   2500     .923    3.66
   3000     .817    4.16
   3500     .690    4.93
   4000     .561    6.06
    WFOV
      0    1.000     .00
    500    1.000    3.56
   1000     .999    7.29
   1500     .972   11.56
   2000     .854   15.48
   2500     .644   20.54
   3000     .435   30.39
   3500     .294   44.90
   4000     .201   65.91
        schedule finish   at time 1050.00
TNK     1     y= 4000.     speed=   .0m/s     exposure=FE
TNK     2     y= 4000.     speed=   .0m/s     exposure=FE
TNK     3     y= 4000.     speed=   .0m/s     exposure=FE
TNK     4     y= 4000.     speed=   .0m/s     exposure=FE
TNK     5     y=    0.     speed=  3.3m/s     exposure=FE
TNK     6     y=    0.     speed=  3.3m/s     exposure=FE
TNK     7     y=    0.     speed=  3.3m/s     exposure=FE
TNK     8     y=    0.     speed=  3.3m/s     exposure=FE
APC     9     y=  100.     speed=  3.3m/s     exposure=FE
APC    10     y=  100.     speed=  3.3m/s     exposure=FE
    .00 red   5 and blue  1 begin the game in-vu.
    .00 blue  1 fails field-of-view search against red   5
        schedule skedet   for blue  1 against red   5 at time  105.01
    .00 red   5 fails field-of-view search against blue  1
        schedule skedet   for red   5 against blue  1 at time  105.01
    .00 red   6 and blue  1 begin the game in-vu.
```

```
.00 blue  1 fails field-of-view search against red   6
    schedule skedet   for blue  1 against red   6 at time  105.01
.00 red   6 fails field-of-view search against blue  1
    schedule skedet   for red   6 against blue  1 at time  105.01
.00 red   7 and blue  1 begin the game in-vu.
.00 blue  1 fails field-of-view search against red   7
    schedule skedet   for blue  1 against red   7 at time  105.01
.00 red   7 fails field-of-view search against blue  1
    schedule skedet   for red   7 against blue  1 at time  105.01
.00 red   8 and blue  1 begin the game in-vu.
.00 blue  1 fails field-of-view search against red   8
    schedule skedet   for blue  1 against red   8 at time  105.01
.00 red   8 fails field-of-view search against blue  1
    schedule skedet   for red   8 against blue  1 at time  105.01
.00 red   9 and blue  1 begin the game in-vu.
.00 blue  1 fails field-of-view search against red   9
    schedule skedet   for blue  1 against red   9 at time  105.01
.00 red   9 fails field-of-view search against blue  1
    schedule skedet   for red   9 against blue  1 at time  105.01
.00 red  10 and blue  1 begin the game in-vu.
.00 blue  1 fails field-of-view search against red  10
    schedule skedet   for blue  1 against red  10 at time  105.01
.00 red  10 fails field-of-view search against blue  1
    schedule skedet   for red  10 against blue  1 at time  105.01
.00 red   5 and blue  2 begin the game in-vu.
.00 blue  2 fails field-of-view search against red   5
    schedule skedet   for blue  2 against red   5 at time  105.01
.00 red   5 fails field-of-view search against blue  2
    schedule skedet   for red   5 against blue  2 at time  105.01
.00 red   6 and blue  2 begin the game in-vu.
.00 blue  2 fails field-of-view search against red   6
    schedule skedet   for blue  2 against red   6 at time  105.01
.00 red   6 fails field-of-view search against blue  2
    schedule skedet   for red   6 against blue  2 at time  105.01
.00 red   7 and blue  2 begin the game in-vu.
.00 blue  2 fails field-of-view search against red   7
    schedule skedet   for blue  2 against red   7 at time  105.01
.00 red   7 fails field-of-view search against blue  2
    schedule skedet   for red   7 against blue  2 at time  105.01
.00 red   8 and blue  2 begin the game in-vu.
.00 blue  2 fails field-of-view search against red   8
    schedule skedet   for blue  2 against red   8 at time  105.01
.00 red   8 fails field-of-view search against blue  2
    schedule skedet   for red   8 against blue  2 at time  105.01
.00 red   9 and blue  2 begin the game in-vu.
.00 blue  2 fails field-of-view search against red   9
    schedule skedet   for blue  2 against red   9 at time  105.01
.00 red   9 fails field-of-view search against blue  2
    schedule skedet   for red   9 against blue  2 at time  105.01
.00 red  10 and blue  2 begin the game in-vu.
.00 blue  2 fails field-of-view search against red  10
    schedule skedet   for blue  2 against red  10 at time  105.01
.00 red  10 fails field-of-view search against blue  2
    schedule skedet   for red  10 against blue  2 at time  105.01
.00 red   5 and blue  3 begin the game in-vu.
    schedule widedt   for blue  3 against red   5 at time   11.65
.00 red   5 fails field-of-view search against blue  3
    schedule skedet   for red   5 against blue  3 at time  105.01
    schedule appear   for red   6 against blue  3 at time  402.66
    schedule appear   for red   7 against blue  3 at time  402.66
    schedule appear   for red   8 against blue  3 at time  402.66
```

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      schedule appear   for red   9 against blue  3 at time  402.66
      schedule appear   for red  10 against blue  3 at time  402.66
      schedule appear   for red   5 against blue  4 at time  333.52
      schedule appear   for red   6 against blue  4 at time  388.41
      schedule appear   for red   7 against blue  4 at time  388.41
      schedule appear   for red   8 against blue  4 at time  388.41
      schedule appear   for red   9 against blue  4 at time  388.41
      schedule appear   for red  10 against blue  4 at time  388.41
11.65 blue  3 sees red   5 and switches to narrow search #dets( 3)= 1 0
      schedule detect   for blue  3 against red   5 at time   14.65
14.65 blue   3 detects red    5 but cannot ID (regu); #dets= 1 1 rng= 3951.
      schedule select   for blue  3 at time   14.65
14.65 blue  3 has no appropriate weapon to fire at red   5 at range   3951.2
14.65 blue  3 cannot select outside firmax: ncantf=   1
      armyf   firer  target       range       firmax
        1       3       5       3951.2       3500.
14.65 blue  3 dis-engs red   5 because he has no chance to engage #dets= 0 0
      schedule widedt   for blue  3 against red   5 at time   22.93
22.93 blue  3 sees red   5 and switches to narrow search #dets( 3)= 1 0
      schedule detect   for blue  3 against red   5 at time   25.93
25.93 blue   3 detects red    5 but cannot ID (regu); #dets= 1 1 rng= 3914.
      schedule select   for blue  3 at time   25.93
25.93 blue  3 has no appropriate weapon to fire at red   5 at range   3913.6
25.93 blue  3 cannot select outside firmax: ncantf=   2
      armyf   firer  target       range       firmax
        1       3       5       3913.6       3500.
25.93 blue  3 dis-engs red   5 because he has no chance to engage #dets= 0 0
      schedule widedt   for blue  3 against red   5 at time   28.51
28.51 blue  3 sees red   5 and switches to narrow search #dets( 3)= 1 0
      schedule detect   for blue  3 against red   5 at time   31.51
31.51 blue   3 detects red    5 but cannot ID (regu); #dets= 1 1 rng= 3895.
      schedule select   for blue  3 at time   31.51
31.51 blue  3 has no appropriate weapon to fire at red   5 at range   3895.0
31.51 blue  3 cannot select outside firmax: ncantf=   3
      armyf   firer  target       range       firmax
        1       3       5       3895.0       3500.
31.51 blue  3 dis-engs red   5 because he has no chance to engage #dets= 0 0
      schedule widedt   for blue  3 against red   5 at time   56.27
56.27 blue  3 sees red   5 and switches to narrow search #dets( 3)= 1 0
      schedule detect   for blue  3 against red   5 at time   59.27
59.27 blue   3 detects red    5 but cannot ID (regu); #dets= 1 1 rng= 3802.
      schedule select   for blue  3 at time   59.27
59.27 blue  3 has no appropriate weapon to fire at red   5 at range   3802.4
59.27 blue  3 cannot select outside firmax: ncantf=   4
      armyf   firer  target       range       firmax
        1       3       5       3802.4       3500.
59.27 blue  3 dis-engs red   5 because he has no chance to engage #dets= 0 0
      schedule skedet   for blue  3 against red   5 at time  164.28
      schedule skedet   for blue  1 against red   5 at time  210.02
      schedule skedet   for red   5 against blue  1 at time  210.02
      schedule skedet   for blue  1 against red   6 at time  210.02
      schedule skedet   for red   6 against blue  1 at time  210.02
      schedule skedet   for blue  1 against red   7 at time  210.02
      schedule skedet   for red   7 against blue  1 at time  210.02
      schedule skedet   for blue  1 against red   8 at time  210.02
      schedule skedet   for red   8 against blue  1 at time  210.02
      schedule skedet   for blue  1 against red   9 at time  210.02
      schedule skedet   for red   9 against blue  1 at time  210.02
      schedule skedet   for blue  1 against red  10 at time  210.02
      schedule skedet   for red  10 against blue  1 at time  210.02
      schedule skedet   for blue  2 against red   5 at time  210.02
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```
        schedule skedet   for red   5 against blue  2 at time  210.02
        schedule skedet   for blue  2 against red   6 at time  210.02
        schedule skedet   for red   6 against blue  2 at time  210.02
        schedule skedet   for blue  2 against red   7 at time  210.02
        schedule skedet   for red   7 against blue  2 at time  210.02
        schedule skedet   for blue  2 against red   8 at time  210.02
        schedule skedet   for red   8 against blue  2 at time  210.02
        schedule skedet   for blue  2 against red   9 at time  210.02
        schedule skedet   for red   9 against blue  2 at time  210.02
        schedule skedet   for blue  2 against red  10 at time  210.02
        schedule skedet   for red  10 against blue  2 at time  210.02
        schedule skedet   for red   5 against blue  3 at time  210.02
        schedule skedet   for blue  3 against red   5 at time  269.29
        schedule widedt   for blue  1 against red   5 at time  213.25
        schedule skedet   for red   5 against blue  1 at time  315.03
        schedule widedt   for blue  1 against red   6 at time  216.68
        schedule skedet   for red   6 against blue  1 at time  315.03
        schedule widedt   for blue  1 against red   7 at time  245.43
        schedule skedet   for red   7 against blue  1 at time  315.03
        schedule widedt   for blue  1 against red   8 at time  210.08
        schedule skedet   for red   8 against blue  1 at time  315.03
        schedule skedet   for blue  1 against red   9 at time  315.03
        schedule skedet   for red   9 against blue  1 at time  315.03
        schedule skedet   for blue  1 against red  10 at time  315.03
        schedule skedet   for red  10 against blue  1 at time  315.03
        schedule widedt   for blue  2 against red   5 at time  212.15
        schedule skedet   for red   5 against blue  2 at time  315.03
        schedule widedt   for blue  2 against red   6 at time  210.58
        schedule skedet   for red   6 against blue  2 at time  315.03
        schedule widedt   for blue  2 against red   7 at time  238.95
        schedule skedet   for red   7 against blue  2 at time  315.03
        schedule widedt   for blue  2 against red   8 at time  217.79
        schedule skedet   for red   8 against blue  2 at time  315.03
        schedule skedet   for blue  2 against red   9 at time  315.03
        schedule skedet   for red   9 against blue  2 at time  315.03
        schedule skedet   for blue  2 against red  10 at time  315.03
        schedule skedet   for red  10 against blue  2 at time  315.03
        schedule skedet   for red   5 against blue  3 at time  315.03
210.08 blue  1 sees red   8 and switches to narrow search #dets( 1)= 1 0
        schedule detect   for blue  1 against red   8 at time  213.08
        cancel widedt   for blue  1 against red   5 at time  213.25
        cancel widedt   for blue  1 against red   6 at time  216.68
        cancel widedt   for blue  1 against red   7 at time  245.43
        cancel skedet   for blue  1 against red   9 at time  315.03
        cancel skedet   for blue  1 against red  10 at time  315.03
210.58 blue  2 sees red   6 and switches to narrow search #dets( 2)= 1 0
        schedule detect   for blue  2 against red   6 at time  213.58
        cancel widedt   for blue  2 against red   5 at time  212.15
        cancel widedt   for blue  2 against red   8 at time  217.79
        cancel widedt   for blue  2 against red   7 at time  238.95
        cancel skedet   for blue  2 against red   9 at time  315.03
        cancel skedet   for blue  2 against red  10 at time  315.03
213.08 blue   1 detects red    8 but cannot ID (regu); #dets= 1 1 rng= 3290.
        schedule select   for blue  1 at time  213.08
213.08 blue  1 chooses weapon BKE1    to fire at red   8 at range   3289.8
213.08 blue  1 selects red   8 with priority   14  #dets= 1 1 #tgts= 1
        schedule laser    for blue  1 against red   8 at time  220.33
        schedule fire     for blue  1 against red   8 at time  223.94
213.58 blue   2 detects red    6 but cannot ID (regu); #dets= 1 1 rng= 3288.
        schedule select   for blue  2 at time  213.58
213.58 blue  2 chooses weapon BKE1    to fire at red   6 at range   3288.1
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213.58 blue  2 selects red   6 with priority   14  #dets= 1 1 #tgts= 1
       schedule laser    for blue  2 against red   6 at time  223.81
       schedule fire     for blue  2 against red   6 at time  228.03
220.33 blue  1 lases red   8 to get range
223.81 blue  2 lases red   6 to get range
223.94 blue  1 fires BKE1    at red   8
       schedule impact   for bullet 101 against red   8 at time  225.94
       schedule fire     for blue  1 against red   8 at time  235.46
225.94 blue  1 (BKE1   ) misses   red   8 & loses round.   rnd#=  1
228.03 blue  2 fires BKE1    at red   6
       schedule impact   for bullet 101 against red   6 at time  229.83
       schedule fire     for blue  2 against red   6 at time  246.41
229.83 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  1
235.46 blue  1 fires BKE1    at red   8
       schedule impact   for bullet 101 against red   8 at time  237.26
       schedule fire     for blue  1 against red   8 at time  262.16
237.26 blue  1 (BKE1   ) hits red   8 but doesn't kill it.  rnd#=  2
246.41 blue  2 fires BKE1    at red   6
       schedule impact   for bullet 101 against red   6 at time  248.21
       schedule fire     for blue  2 against red   6 at time  263.80
248.21 blue  2 (BKE1   )  m-kills red   6         range = 3172.72  rnd#=  2
       cancel appear   for red   6 against blue  4 at time  388.41
       cancel appear   for red   6 against blue  3 at time  402.66
       schedule slowup   for red   6 at time  248.21
248.21 red   6 is moved from group  6 to group  7
       schedule halt     for red   6 at time  249.87
248.21 red   6 brakes           (was cruising)
249.87 red   6 halts            range =3173. meters
262.16 blue  1 fires BKE1    at red   8
       schedule impact   for bullet 101 against red   8 at time  263.96
       schedule fire     for blue  1 against red   8 at time  265.87
263.80 blue  2 fires BKE1    at red   6
263.80 red   6 sees blue  2 muzzle flash and tries to detect
       cancel skedet   for red   6 against blue  2 at time  315.03
       schedule pinpt    for red   6 against blue  2 at time  268.18
       schedule impact   for bullet 113 against red   6 at time  265.60
       schedule fire     for blue  2 against red   6 at time  275.80
263.96 blue  1 (BKE1   ) misses   red   8 & loses round.   rnd#=  3
265.60 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  3
265.87 blue  1 fires BKE1    at red   8
265.87 red   9 sees blue  1 muzzle flash and tries to detect
       cancel skedet   for red   9 against blue  1 at time  315.03
       schedule pinpt    for red   9 against blue  1 at time  282.54
       schedule impact   for bullet 101 against red   8 at time  267.67
       schedule fire     for blue  1 against red   8 at time  269.44
267.67 blue  1 (BKE1   ) mf-kills red   8         range = 3107.85  rnd#=  4
       cancel skedet   for red   8 against blue  1 at time  315.03
       cancel skedet   for red   8 against blue  2 at time  315.03
       cancel appear   for red   8 against blue  4 at time  388.41
       cancel appear   for red   8 against blue  3 at time  402.66
       schedule slowup   for red   8 at time  267.67
267.67 red   8 is moved from group  6 to group  8
       schedule ikill    for red   8 against blue  1 at time  297.67
       schedule halt     for red   8 at time  269.34
267.67 red   8 brakes           (was cruising)
268.18 red    6 detects blue   2 but cannot ID (pinp); #dets= 1 1 rng= 3173.
       cancel skedet   for red   6 against blue  1 at time  315.03
       schedule select   for red   6 at time  268.18
268.18 red   6 chooses weapon RMI1    to fire at blue  2 at range   3172.7
268.18 red   6 selects blue  2 with priority    9  #dets= 1 1 #tgts= 1
       schedule fire     for red   6 against blue  2 at time  283.95
```

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       schedule widedt   for blue  3 against red   5 at time  342.26
269.34 red   8 halts              range =3108. meters
269.44 blue  1 fires BKE1    at red   8
       schedule impact   for bullet 101 against red   8 at time  271.24
       schedule fire     for blue  1 against red   8 at time  282.93
271.24 blue  1 (BKE1   ) mf-kills red   8         range = 3107.85  rnd#=  5
275.80 blue  2 fires BKE1    at red   6
275.80 red   9 sees blue  2 muzzle flash and tries to detect
       cancel skedet   for red   9 against blue  2 at time  315.03
       schedule pinpt    for red   9 against blue  2 at time  279.72
       schedule impact   for bullet 101 against red   6 at time  277.60
       schedule fire     for blue  2 against red   6 at time  282.94
277.60 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  4
279.72 red   9 detects blue   2 but cannot ID (pinp); #dets= 1 1 rng= 2968.
       cancel pinpt    for red   9 against blue  1 at time  282.54
       schedule select   for red   9 at time  279.72
279.72 red   9 chooses weapon RMI2    to fire at blue  2 at range   2967.7
279.72 red   9 selects blue  2 with priority    9  #dets= 1 1 #tgts= 1
       schedule slowup   for red   9 at time  279.72
       schedule halt     for red   9 at time  281.39
279.72 red   9 brakes             (was cruising)
       cancel appear   for red   9 against blue  3 at time  402.66
       cancel appear   for red   9 against blue  4 at time  388.41
281.39 red   9 halts              range =2968. meters
       schedule fire     for red   9 against blue  2 at time  289.05
282.93 blue  1 fires BKE1    at red   8
       schedule impact   for bullet 101 against red   8 at time  284.73
       schedule fire     for blue  1 against red   8 at time  294.11
282.94 blue  2 fires BKE1    at red   6
282.94 red  10 sees blue  2 muzzle flash and tries to detect
       cancel skedet   for red  10 against blue  2 at time  315.03
       schedule pinpt    for red  10 against blue  2 at time  285.67
       schedule impact   for bullet 113 against red   6 at time  284.74
       schedule fire     for blue  2 against red   6 at time  288.00
283.95 red   6 fires RMI1    at blue  2
       schedule impact   for bullet 125 against blue  2 at time  297.95
284.73 blue  1 (BKE1   ) misses   red   8 & loses round.   rnd#=  6
284.74 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  5
285.67 red  10 detects blue   2 but cannot ID (pinp); #dets= 1 1 rng= 2948.
       cancel skedet   for red  10 against blue  1 at time  315.03
       schedule select   for red  10 at time  285.67
285.67 red  10 chooses weapon RMI2    to fire at blue  2 at range   2947.9
285.67 red  10 selects blue  2 with priority    9  #dets= 1 1 #tgts= 1
       schedule slowup   for red  10 at time  285.67
       schedule halt     for red  10 at time  287.34
285.67 red  10 brakes             (was cruising)
       cancel appear   for red  10 against blue  3 at time  402.66
       cancel appear   for red  10 against blue  4 at time  388.41
287.34 red  10 halts              range =2948. meters
       schedule fire     for red  10 against blue  2 at time  305.28
288.00 blue  2 fires BKE1    at red   6
       schedule impact   for bullet 101 against red   6 at time  289.80
       schedule fire     for blue  2 against red   6 at time  296.99
289.05 red   9 fires RMI2    at blue  2
       schedule impact   for bullet 137 against blue  2 at time  303.05
289.80 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  6
294.11 blue  1 fires BKE1    at red   8
       schedule impact   for bullet 101 against red   8 at time  295.91
       schedule fire     for blue  1 against red   8 at time  310.72
295.91 blue  1 (BKE1   ) hits red   8 but doesn't kill it.  rnd#=  7
       schedule ikill    for red   8 against blue  1 at time  295.91
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295.91 red   8 i-killed.
       cancel ikill    for red   8 against blue  1 at time  297.67
295.91 blue  1 leaves red   8 after tgt is killed #dets=  1  1 #tgts= 1
       cancel fire     for blue  1 against red   8 at time  310.72
       schedule widedt   for blue  1 against red   5 at time  314.42
       schedule widedt   for blue  1 against red   6 at time  307.40
       schedule widedt   for blue  1 against red   7 at time  309.58
296.99 blue  2 fires BKE1    at red   6
       schedule impact   for bullet 149 against red   6 at time  298.79
       schedule fire     for blue  2 against red   6 at time  298.90
297.95 red   6 (RMI1   ) misses   blue  2 & loses round.   rnd#=  1
       schedule fire     for red   6 against blue  2 at time  303.30
298.79 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  7
298.90 blue  2 fires BKE1    at red   6
       schedule impact   for bullet 101 against red   6 at time  300.70
       schedule fire     for blue  2 against red   6 at time  317.11
300.70 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  8
303.05 red   9 (RMI2   ) misses   blue  2 & loses round.   rnd#=  1
       schedule fire     for red   9 against blue  2 at time  311.39
303.30 red   6 fires RMI1    at blue  2
       schedule impact   for bullet 137 against blue  2 at time  317.30
305.28 red  10 fires RMI2    at blue  2
       schedule impact   for bullet 101 against blue  2 at time  319.28
307.40 blue  1 sees red   6 and switches to narrow search #dets( 1)= 1 0
       schedule detect   for blue  1 against red   6 at time  310.40
       cancel widedt   for blue  1 against red   7 at time  309.58
       cancel widedt   for blue  1 against red   5 at time  314.42
310.40 blue  1 detects red   6 but cannot ID (regu); #dets= 1 1 rng= 3173.
       schedule select   for blue  1 at time  310.40
310.40 blue  1 chooses weapon BKE1    to fire at red   6 at range   3172.7
310.40 blue  1 selects red   6 with priority    9  #dets= 1 1 #tgts= 1
       schedule laser    for blue  1 against red   6 at time  326.05
       schedule fire     for blue  1 against red   6 at time  328.14
311.39 red   9 fires RMI2    at blue  2
       schedule impact   for bullet 149 against blue  2 at time  325.39
       schedule skedet   for red   5 against blue  1 at time  420.04
       schedule skedet   for red   7 against blue  1 at time  420.04
       schedule skedet   for red   5 against blue  2 at time  420.04
       schedule skedet   for red   7 against blue  2 at time  420.04
       schedule skedet   for red   5 against blue  3 at time  420.04
317.11 blue  2 fires BKE1    at red   6
       schedule impact   for bullet 113 against red   6 at time  318.91
       schedule fire     for blue  2 against red   6 at time  323.66
317.30 red   6 (RMI1   ) mf-kills blue  2         range = 3172.72  rnd#=  2
       cancel fire     for blue  2 against red   6 at time  323.66
       schedule ikill    for blue  2 against red   6 at time  347.30
       schedule fire     for red   6 against blue  2 at time  329.97
318.91 blue  2 (BKE1   ) misses   red   6 & loses round.   rnd#=  9
319.28 red  10 (RMI2   ) misses   blue  2 & loses round.   rnd#=  1
       schedule fire     for red  10 against blue  2 at time  326.83
325.39 red   9 (RMI2   ) mf-kills blue  2         range = 2967.68  rnd#=  2
       schedule reload   for red   9 at time  355.39
325.39 red   9 begins to reload, fully exposed
326.05 blue  1 lases red   6 to get range
326.83 red  10 fires RMI2    at blue  2
       schedule impact   for bullet 137 against blue  2 at time  340.83
328.14 blue  1 fires BKE1    at red   6
       schedule impact   for bullet 101 against red   6 at time  329.94
       schedule fire     for blue  1 against red   6 at time  335.59
329.94 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#=  8
329.97 red   6 fires RMI1    at blue  2
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       schedule impact   for bullet 149 against blue  2 at time  343.97
333.52 red   5 appears for  blue  4
       schedule widedt   for blue  4 against red   5 at time  342.43
333.52 red   5 fails field-of-view search against blue  4
       schedule skedet   for red   5 against blue  4 at time  438.53
335.59 blue  1 fires BKE1    at red   6
       schedule impact   for bullet 101 against red   6 at time  337.39
       schedule fire     for blue  1 against red   6 at time  340.95
337.39 blue  1 (BKE1   ) hits red   6 but doesn't kill it.  rnd#=  9
340.83 red  10 (RMI2   ) misses   blue  2 & loses round.   rnd#=  2
       schedule reload   for red  10 at time  370.83
340.83 red  10 begins to reload, fully exposed
340.95 blue  1 fires BKE1    at red   6
       schedule impact   for bullet 137 against red   6 at time  342.75
       schedule fire     for blue  1 against red   6 at time  351.17
342.26 blue  3 sees red   5 and switches to narrow search #dets( 3)= 1 0
       schedule detect   for blue  3 against red   5 at time  345.26
342.43 blue  4 sees red   5 and switches to narrow search #dets( 4)= 1 0
       schedule detect   for blue  4 against red   5 at time  345.43
342.75 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 10
343.97 red   6 (RMI1   )  m-kills blue  2         range = 3172.72  rnd#=  3
       schedule fire     for red   6 against blue  2 at time  393.17
345.26 blue   3 detects red    5 but cannot ID (regu); #dets= 1 1 rng= 2849.
       schedule select   for blue  3 at time  345.26
345.26 blue  3 chooses weapon BKE1    to fire at red   5 at range   2849.3
345.26 blue  3 selects red   5 with priority   14  #dets= 1 1 #tgts= 1
       schedule laser    for blue  3 against red   5 at time  347.33
       schedule fire     for blue  3 against red   5 at time  350.89
345.43 blue   4 detects red    5 but cannot ID (regu); #dets= 1 1 rng= 2849.
       schedule select   for blue  4 at time  345.43
345.43 blue  4 chooses weapon BKE1    to fire at red   5 at range   2848.7
345.43 blue  4 selects red   5 with priority   14  #dets= 1 1 #tgts= 1
       schedule laser    for blue  4 against red   5 at time  355.26
       schedule fire     for blue  4 against red   5 at time  358.31
347.30 blue  2 i-killed.
       cancel skedet   for red   5 against blue  2 at time  420.04
347.30 red   6 leaves blue  2 after tgt is killed #dets=  1  1 #tgts= 1
       cancel fire     for red   6 against blue  2 at time  393.17
       cancel skedet   for red   7 against blue  2 at time  420.04
347.30 red   9 leaves blue  2 after tgt is killed #dets=  1  1 #tgts= 1
347.30 red  10 leaves blue  2 after tgt is killed #dets=  1  1 #tgts= 1
347.33 blue  3 lases red   5 to get range
350.89 blue  3 fires BKE1    at red   5
       schedule impact   for bullet 149 against red   5 at time  352.69
       schedule fire     for blue  3 against red   5 at time  357.72
351.17 blue  1 fires BKE1    at red   6
       schedule impact   for bullet 101 against red   6 at time  352.97
       schedule fire     for blue  1 against red   6 at time  388.37
352.69 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  1
352.97 blue  1 (BKE1   ) hits red   6 but doesn't kill it.  rnd#= 11
355.26 blue  4 lases red   5 to get range
355.39 red   9 finishes reloading
       schedule accel    for red   9 at time  355.39
       schedule maxvel   for red   9 at time  358.72
355.39 red   9 accelerates from stationary
       schedule vanish   for red   9 against blue  1 at time  360.39
       schedule appear   for red   9 against blue  3 at time  360.39
       schedule appear   for red   9 against blue  4 at time  360.39
357.72 blue  3 fires BKE1    at red   5
       schedule impact   for bullet 149 against red   5 at time  359.52
       schedule fire     for blue  3 against red   5 at time  366.71
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358.31 blue  4 fires BKE1     at red   5
       schedule impact    for bullet 101 against red   5 at time  360.11
       schedule fire      for blue  4 against red   5 at time  370.48
358.72 red   9 at full speed.
359.52 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  2
360.11 blue  4 (BKE1   ) hits red   5 but doesn't kill it.  rnd#=  1
       schedule appear    for red   9 against blue  3 at time  479.99
       schedule appear    for red   9 against blue  4 at time  465.74
366.71 blue  3 fires BKE1     at red   5
       schedule impact    for bullet 149 against red   5 at time  368.51
       schedule fire      for blue  3 against red   5 at time  373.91
368.51 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  3
370.48 blue  4 fires BKE1     at red   5
       schedule impact    for bullet 101 against red   5 at time  372.28
       schedule fire      for blue  4 against red   5 at time  377.91
370.83 red  10 finishes reloading
       schedule accel     for red  10 at time  370.83
       schedule maxvel    for red  10 at time  374.16
370.83 red  10 accelerates from stationary
       schedule vanish    for red  10 against blue  1 at time  375.83
       schedule appear    for red  10 against blue  3 at time  375.83
       schedule appear    for red  10 against blue  4 at time  375.83
372.28 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  2
373.91 blue  3 fires BKE1     at red   5
       schedule impact    for bullet 101 against red   5 at time  375.71
       schedule fire      for blue  3 against red   5 at time  386.97
374.16 red  10 at full speed.
375.71 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  4
       schedule appear    for red  10 against blue  3 at time  489.48
       schedule appear    for red  10 against blue  4 at time  475.23
377.91 blue  4 fires BKE1     at red   5
       schedule impact    for bullet 101 against red   5 at time  379.31
       schedule fire      for blue  4 against red   5 at time  386.17
379.31 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  3
386.17 blue  4 fires BKE1     at red   5
       schedule impact    for bullet 101 against red   5 at time  387.57
       schedule fire      for blue  4 against red   5 at time  397.97
386.97 blue  3 fires BKE1     at red   5
       schedule impact    for bullet 113 against red   5 at time  388.37
       schedule fire      for blue  3 against red   5 at time  392.20
387.57 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  4
388.37 blue  3 (BKE1   ) hits red   5 but doesn't kill it.  rnd#=  5
388.37 blue  1 fires BKE1     at red   6
       schedule impact    for bullet 101 against red   6 at time  390.17
       schedule fire      for blue  1 against red   6 at time  400.45
388.41 red   7 appears for  blue  4
388.41 red   7 fails field-of-view search against blue  4
       schedule skedet    for red   7 against blue  4 at time  493.42
390.17 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 12
392.20 blue  3 fires BKE1     at red   5
       schedule impact    for bullet 101 against red   5 at time  393.60
       schedule fire      for blue  3 against red   5 at time  399.76
393.60 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  6
397.97 blue  4 fires BKE1     at red   5
       schedule impact    for bullet 101 against red   5 at time  399.37
       schedule fire      for blue  4 against red   5 at time  428.89
399.37 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  5
399.76 blue  3 fires BKE1     at red   5
       schedule impact    for bullet 101 against red   5 at time  401.16
       schedule fire      for blue  3 against red   5 at time  407.44
400.45 blue  1 fires BKE1     at red   6
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400.45 red  10 sees blue  1 muzzle flash and tries to detect
       schedule pinpt    for red  10 against blue  1 at time  403.59
       schedule impact   for bullet 113 against red   6 at time  402.25
       schedule fire     for blue  1 against red   6 at time  412.12
401.16 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  7
402.25 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 13
402.66 red   7 appears for  blue  3
402.66 red   7 fails field-of-view search against blue  3
       schedule skedet   for red   7 against blue  3 at time  507.67
403.59 red  10 detects blue   1 but cannot ID (pinp); #dets= 1 1 rng= 2844.
       schedule select   for red  10 at time  403.59
403.59 red  10 chooses weapon RMI2    to fire at blue  1 at range   2844.2
403.59 red  10 selects blue  1 with priority    9  #dets= 1 1 #tgts= 1
       schedule slowup   for red  10 at time  403.59
       schedule halt     for red  10 at time  405.26
403.59 red  10 brakes             (was cruising)
       cancel appear   for red  10 against blue  3 at time  489.48
       cancel appear   for red  10 against blue  4 at time  475.23
405.26 red  10 halts              range =2844. meters
       schedule fire     for red  10 against blue  1 at time  416.71
407.44 blue  3 fires BKE1    at red   5
       schedule impact   for bullet 101 against red   5 at time  408.84
       schedule fire     for blue  3 against red   5 at time  422.62
408.84 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  8
412.12 blue  1 fires BKE1    at red   6
       schedule impact   for bullet 101 against red   6 at time  413.92
       schedule fire     for blue  1 against red   6 at time  422.10
413.92 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 14
416.71 red  10 fires RMI2    at blue  1
       schedule impact   for bullet 101 against blue  1 at time  430.71
       schedule skedet   for red   5 against blue  1 at time  525.05
       schedule skedet   for red   7 against blue  1 at time  525.05
       schedule skedet   for red   5 against blue  3 at time  525.05
422.10 blue  1 fires BKE1    at red   6
       schedule impact   for bullet 113 against red   6 at time  423.90
       schedule fire     for blue  1 against red   6 at time  438.41
422.62 blue  3 fires BKE1    at red   5
       schedule impact   for bullet 125 against red   5 at time  424.02
       schedule fire     for blue  3 against red   5 at time  440.38
423.90 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 15
424.02 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#=  9
428.89 blue  4 fires BKE1    at red   5
       schedule impact   for bullet 113 against red   5 at time  430.29
       schedule fire     for blue  4 against red   5 at time  438.10
430.29 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  6
430.71 red  10 (RMI2   ) misses   blue  1 & loses round.   rnd#=  3
       schedule fire     for red  10 against blue  1 at time  436.07
436.07 red  10 fires RMI2    at blue  1
       schedule impact   for bullet 101 against blue  1 at time  450.07
438.10 blue  4 fires BKE1    at red   5
       schedule impact   for bullet 113 against red   5 at time  439.50
       schedule fire     for blue  4 against red   5 at time  450.10
438.41 blue  1 fires BKE1    at red   6
       schedule impact   for bullet 125 against red   6 at time  440.21
       schedule fire     for blue  1 against red   6 at time  447.00
       schedule skedet   for red   5 against blue  4 at time  543.54
439.50 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  7
440.21 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 16
440.38 blue  3 fires BKE1    at red   5
       schedule impact   for bullet 113 against red   5 at time  441.78
       schedule fire     for blue  3 against red   5 at time  452.79
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441.78 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#= 10
447.00 blue  1 fires BKE1     at red   6
       schedule impact   for bullet 113 against red   6 at time  448.80
       schedule fire     for blue  1 against red   6 at time  476.84
448.80 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 17
450.07 red  10 (RMI2   ) misses   blue  1 & loses round.   rnd#=  4
       schedule reload   for red  10 at time  480.07
450.07 red  10 begins to reload, fully exposed
450.10 blue  4 fires BKE1     at red   5
       schedule impact   for bullet 101 against red   5 at time  451.50
       schedule fire     for blue  4 against red   5 at time  457.36
451.50 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  8
452.79 blue  3 fires BKE1     at red   5
       schedule impact   for bullet 101 against red   5 at time  454.19
       schedule fire     for blue  3 against red   5 at time  460.85
454.19 blue  3 (BKE1   ) hits red   5 but doesn't kill it.  rnd#= 11
457.36 blue  4 fires BKE1     at red   5
       schedule impact   for bullet 101 against red   5 at time  458.76
       schedule fire     for blue  4 against red   5 at time  480.43
458.76 blue  4 (BKE1   ) misses   red   5 & loses round.   rnd#=  9
460.85 blue  3 fires BKE1     at red   5
       schedule impact   for bullet 101 against red   5 at time  462.25
       schedule fire     for blue  3 against red   5 at time  470.36
462.25 blue  3 (BKE1   ) misses   red   5 & loses round.   rnd#= 12
465.74 red   9 appears for  blue  4
465.74 red   9 fails field-of-view search against blue  4
       schedule skedet   for red   9 against blue  4 at time  570.75
470.36 blue  3 fires BKE1     at red   5
       schedule impact   for bullet 101 against red   5 at time  471.76
       schedule fire     for blue  3 against red   5 at time  480.16
471.76 blue  3 (BKE1   )  k-kills red   5          range = 2427.62  rnd#= 13
       cancel skedet   for red   5 against blue  1 at time  525.05
       cancel skedet   for red   5 against blue  3 at time  525.05
       cancel skedet   for red   5 against blue  4 at time  543.54
       schedule slowup   for red   5 at time  471.76
471.76 blue  3 leaves red   5 after tgt is killed #dets=  1  1 #tgts= 1
       cancel fire     for blue  3 against red   5 at time  480.16
       schedule widedt   for blue  3 against red   7 at time  486.54
471.76 blue  4 leaves red   5 after tgt is killed #dets=  1  1 #tgts= 1
       cancel fire     for blue  4 against red   5 at time  480.43
       schedule widedt   for blue  4 against red   7 at time  487.84
       schedule widedt   for blue  4 against red   9 at time  472.88
       schedule halt     for red   5 at time  473.43
471.76 red   5 brakes            (was cruising)
472.88 blue  4 sees red   9 and switches to narrow search #dets( 4)= 1 0
       schedule detect   for blue  4 against red   9 at time  475.88
       cancel widedt   for blue  4 against red   7 at time  487.84
473.43 red   5 halts             range =2428. meters
475.88 blue  4 detects red   9 but cannot ID (regu); #dets= 1 1 rng= 2572.
       schedule select   for blue  4 at time  475.88
475.88 blue  4 chooses weapon BKE1    to fire at red   9 at range   2571.6
475.88 blue  4 selects red   9 with priority   14  #dets= 1 1 #tgts= 1
       schedule laser    for blue  4 against red   9 at time  487.33
       schedule fire     for blue  4 against red   9 at time  488.91
476.84 blue  1 fires BKE1     at red   6
       schedule impact   for bullet 101 against red   6 at time  478.64
       schedule fire     for blue  1 against red   6 at time  492.37
478.64 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 18
479.99 red   9 appears for  blue  3
       schedule widedt   for blue  3 against red   9 at time  482.30
479.99 red   9 fails field-of-view search against blue  3
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       schedule skedet   for red   9 against blue  3 at time  585.00
480.07 red  10 finishes reloading
       schedule fire     for red  10 against blue  1 at time  480.07
480.07 red  10 fires RMI2     at blue  1
       schedule impact   for bullet 101 against blue  1 at time  494.07
482.30 blue  3 sees red   9 and switches to narrow search #dets( 3)= 1 0
       schedule detect   for blue  3 against red   9 at time  485.30
       cancel widedt   for blue  3 against red   7 at time  486.54
485.30 blue   3 detects red    9 but cannot ID (regu); #dets= 1 1 rng= 2540.
       schedule select   for blue  3 at time  485.30
485.30 blue  3 chooses weapon BKE1    to fire at red   9 at range   2540.2
485.30 blue  3 selects red   9 with priority   14  #dets= 1 1 #tgts= 1
       schedule laser    for blue  3 against red   9 at time  490.85
       schedule fire     for blue  3 against red   9 at time  493.17
487.33 blue  4 lases red   9 to get range
488.91 blue  4 fires BKE1     at red   9
       schedule impact   for bullet 113 against red   9 at time  490.31
       schedule fire     for blue  4 against red   9 at time  500.21
490.31 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 10
490.85 blue  3 lases red   9 to get range
492.37 blue  1 fires BKE1     at red   6
       schedule impact   for bullet 113 against red   6 at time  494.17
       schedule fire     for blue  1 against red   6 at time  500.37
493.17 blue  3 fires BKE1     at red   9
       schedule impact   for bullet 125 against red   9 at time  494.57
       schedule fire     for blue  3 against red   9 at time  504.58
       schedule skedet   for red   7 against blue  4 at time  598.43
494.07 red  10 (RMI2   ) dud hits blue  1
       schedule fire     for red  10 against blue  1 at time  501.89
494.17 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 19
494.57 blue  3 (BKE1   ) hits red   9 but doesn't kill it.  rnd#= 14
500.21 blue  4 fires BKE1     at red   9
       schedule impact   for bullet 101 against red   9 at time  501.61
       schedule fire     for blue  4 against red   9 at time  509.86
500.37 blue  1 fires BKE1     at red   6
       schedule impact   for bullet 113 against red   6 at time  502.17
       schedule fire     for blue  1 against red   6 at time  507.88
501.61 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 11
501.89 red  10 fires RMI2     at blue  1
       schedule impact   for bullet 101 against blue  1 at time  515.89
502.17 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 20
504.58 blue  3 fires BKE1     at red   9
       schedule impact   for bullet 113 against red   9 at time  505.98
       schedule fire     for blue  3 against red   9 at time  514.45
505.98 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 15
       schedule skedet   for red   7 against blue  3 at time  612.68
507.88 blue  1 fires BKE1     at red   6
       schedule impact   for bullet 113 against red   6 at time  509.68
       schedule fire     for blue  1 against red   6 at time  516.62
509.68 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 21
509.86 blue  4 fires BKE1     at red   9
       schedule impact   for bullet 113 against red   9 at time  511.26
       schedule fire     for blue  4 against red   9 at time  526.40
511.26 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 12
514.45 blue  3 fires BKE1     at red   9
       schedule impact   for bullet 113 against red   9 at time  515.85
       schedule fire     for blue  3 against red   9 at time  524.18
515.85 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 16
515.89 red  10 (RMI2   ) misses   blue  1 & loses round.   rnd#=  6
       schedule reload   for red  10 at time  545.89
515.89 red  10 begins to reload, fully exposed
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516.62 blue  1 fires BKE1     at red   6
       schedule impact   for bullet 101 against red   6 at time  518.42
       schedule fire     for blue  1 against red   6 at time  538.73
518.42 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 22
524.18 blue  3 fires BKE1     at red   9
       schedule impact   for bullet 101 against red   9 at time  525.58
       schedule fire     for blue  3 against red   9 at time  529.62
       schedule skedet   for red   7 against blue  1 at time  630.06
525.58 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 17
526.40 blue  4 fires BKE1     at red   9
       schedule impact   for bullet 101 against red   9 at time  527.80
       schedule fire     for blue  4 against red   9 at time  535.34
527.80 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 13
529.62 blue  3 fires BKE1     at red   9
       schedule impact   for bullet 101 against red   9 at time  531.02
       schedule fire     for blue  3 against red   9 at time  536.34
531.02 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 18
535.34 blue  4 fires BKE1     at red   9
       schedule impact   for bullet 101 against red   9 at time  536.74
       schedule fire     for blue  4 against red   9 at time  539.94
536.34 blue  3 fires BKE1     at red   9
       schedule impact   for bullet 113 against red   9 at time  537.74
       schedule fire     for blue  3 against red   9 at time  560.20
536.74 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 14
537.74 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 19
538.73 blue  1 fires BKE1     at red   6
       schedule impact   for bullet 101 against red   6 at time  540.53
       schedule fire     for blue  1 against red   6 at time  542.92
539.94 blue  4 fires BKE1     at red   9
       schedule impact   for bullet 113 against red   9 at time  541.34
       schedule fire     for blue  4 against red   9 at time  558.47
540.53 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 23
541.34 blue  4 (BKE1   ) hits red   9 but doesn't kill it.  rnd#= 15
542.92 blue  1 fires BKE1     at red   6
       schedule impact   for bullet 101 against red   6 at time  544.72
       schedule fire     for blue  1 against red   6 at time  549.47
544.72 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 24
545.89 red  10 finishes reloading
       schedule fire     for red  10 against blue  1 at time  545.89
545.89 red  10 fires RMI2     at blue  1
       schedule impact   for bullet 101 against blue  1 at time  559.89
549.47 blue  1 fires BKE1     at red   6
       schedule impact   for bullet 113 against red   6 at time  551.27
       schedule fire     for blue  1 against red   6 at time  562.97
551.27 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 25
558.47 blue  4 fires BKE1     at red   9
       schedule impact   for bullet 113 against red   9 at time  559.87
       schedule fire     for blue  4 against red   9 at time  568.65
559.87 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 16
559.89 red  10 (RMI2   ) misses   blue  1 & loses round.   rnd#=  7
       schedule fire     for red  10 against blue  1 at time  583.66
560.20 blue  3 fires BKE1     at red   9
560.20 red   7 sees blue  3 muzzle flash and tries to detect
       cancel skedet   for red   7 against blue  3 at time  612.68
       schedule pinpt    for red   7 against blue  3 at time  562.68
       schedule impact   for bullet 101 against red   9 at time  561.60
       schedule fire     for blue  3 against red   9 at time  567.20
561.60 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 20
562.68 red   7 detects blue   3 but cannot ID (pinp); #dets= 1 1 rng= 2125.
       cancel skedet   for red   7 against blue  4 at time  598.43
       cancel skedet   for red   7 against blue  1 at time  630.06
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      schedule select   for red   7 at time  562.68
562.68 red   7 chooses weapon RMI1    to fire at blue  3 at range   2124.6
562.68 red   7 selects blue  3 with priority    9  #dets= 1 1 #tgts= 1
      schedule fire     for red   7 against blue  3 at time  572.49
562.97 blue  1 fires BKE1     at red   6
      schedule impact   for bullet 101 against red   6 at time  564.77
      schedule fire     for blue  1 against red   6 at time  574.14
564.77 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 26
567.20 blue  3 fires BKE1     at red   9
      schedule impact   for bullet 101 against red   9 at time  568.60
      schedule fire     for blue  3 against red   9 at time  572.46
568.60 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 21
568.65 blue  4 fires BKE1     at red   9
      schedule impact   for bullet 101 against red   9 at time  570.05
      schedule fire     for blue  4 against red   9 at time  579.12
570.05 blue  4 (BKE1   ) misses   red   9 & loses round.   rnd#= 17
      schedule skedet   for red   9 against blue  4 at time  675.76
572.46 blue  3 fires BKE1     at red   9
      schedule impact   for bullet 101 against red   9 at time  573.46
      schedule fire     for blue  3 against red   9 at time  579.53
572.49 red   7 fires RMI1     at blue  3
      schedule impact   for bullet 113 against blue  3 at time  582.49
573.46 blue  3 (BKE1   ) mf-kills red   9         range = 2246.39  rnd#= 22
      cancel skedet   for red   9 against blue  3 at time  585.00
      cancel skedet   for red   9 against blue  4 at time  675.76
      schedule slowup   for red   9 at time  573.46
573.46 red   9 is moved from group  6 to group  9
      schedule ikill    for red   9 against blue  3 at time  603.46
      schedule halt     for red   9 at time  575.13
573.46 red   9 brakes          (was cruising)
574.14 blue  1 fires BKE1     at red   6
      schedule impact   for bullet 101 against red   6 at time  575.94
      schedule fire     for blue  1 against red   6 at time  586.59
575.13 red   9 halts            range =2246. meters
575.94 blue  1 (BKE1   ) mf-kills red   6         range = 3172.72  rnd#= 27
      schedule ikill    for red   6 against blue  1 at time  605.94
579.12 blue  4 fires BKE1     at red   9
      schedule impact   for bullet 125 against red   9 at time  580.12
      schedule fire     for blue  4 against red   9 at time  589.88
579.53 blue  3 fires BKE1     at red   9
      schedule impact   for bullet 101 against red   9 at time  580.53
      schedule fire     for blue  3 against red   9 at time  588.64
580.12 blue  4 (BKE1   )  k-kills red   9         range = 2246.39  rnd#= 18
      cancel ikill    for red   9 against blue  3 at time  603.46
580.12 blue  3 leaves red   9 after tgt is killed #dets=  1  1 #tgts= 1
      cancel fire     for blue  3 against red   9 at time  588.64
      schedule widedt   for blue  3 against red   7 at time  586.44
580.12 blue  4 leaves red   9 after tgt is killed #dets=  1  1 #tgts= 1
      cancel fire     for blue  4 against red   9 at time  589.88
      schedule widedt   for blue  4 against red   7 at time  581.95
580.53 blue  3 (BKE1   ) misses   red   9 & loses round.   rnd#= 23
581.95 blue  4 sees red   7 and switches to narrow search #dets( 4)= 1 0
      schedule detect   for blue  4 against red   7 at time  584.95
582.49 red   7 (RMI1   )  k-kills blue  3         range = 2058.56  rnd#=  1
      cancel widedt   for blue  3 against red   7 at time  586.44
582.49 red   7 leaves blue  3 after tgt is killed #dets=  1  1 #tgts= 1
583.66 red  10 fires RMI2     at blue  1
      schedule impact   for bullet 113 against blue  1 at time  597.66
584.95 blue   4 detects red    7 but cannot ID (regu); #dets= 1 1 rng= 2050.
      schedule select   for blue  4 at time  584.95
584.95 blue  4 chooses weapon BKE1    to fire at red   7 at range   2050.3
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584.95 blue  4 selects red   7 with priority    9  #dets= 1 1 #tgts= 1
       schedule laser    for blue  4 against red   7 at time  588.64
       schedule fire     for blue  4 against red   7 at time  592.53
586.59 blue  1 fires BKE1    at red   6
       schedule impact   for bullet 101 against red   6 at time  588.39
       schedule fire     for blue  1 against red   6 at time  593.70
588.39 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 28
588.64 blue  4 lases red   7 to get range
592.53 blue  4 fires BKE1    at red   7
       schedule impact   for bullet 125 against red   7 at time  593.53
       schedule fire     for blue  4 against red   7 at time  596.82
593.53 blue  4 (BKE1   )  m-kills red   7         range = 2021.78  rnd#= 19
       schedule slowup   for red   7 at time  593.53
593.53 red   7 is moved from group  6 to group 10
       schedule halt     for red   7 at time  595.19
593.53 red   7 brakes           (was cruising)
593.70 blue  1 fires BKE1    at red   6
       schedule impact   for bullet 101 against red   6 at time  595.50
       schedule fire     for blue  1 against red   6 at time  605.64
595.19 red   7 halts           range =2022. meters
595.50 blue  1 (BKE1   ) misses   red   6 & loses round.   rnd#= 29
596.82 blue  4 fires BKE1    at red   7
       schedule impact   for bullet 125 against red   7 at time  597.82
       schedule fire     for blue  4 against red   7 at time  602.66
597.66 red  10 (RMI2   ) mf-kills blue  1         range = 2844.22  rnd#=  8
       cancel fire     for blue  1 against red   6 at time  605.64
       schedule ikill    for blue  1 against red  10 at time  627.66
597.66 red  10 dis-engs blue  1 because current weapon empty       #dets= 0 0
597.82 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 20
602.66 blue  4 fires BKE1    at red   7
       schedule impact   for bullet 101 against red   7 at time  603.66
       schedule fire     for blue  4 against red   7 at time  612.50
603.66 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 21
605.94 red   6 i-killed.
612.50 blue  4 fires BKE1    at red   7
       schedule impact   for bullet 101 against red   7 at time  613.50
       schedule fire     for blue  4 against red   7 at time  626.64
613.50 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 22
626.64 blue  4 fires BKE1    at red   7
       schedule impact   for bullet 101 against red   7 at time  627.64
       schedule fire     for blue  4 against red   7 at time  636.64
627.64 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 23
627.66 blue  1 i-killed.
636.64 blue  4 fires BKE1    at red   7
       schedule impact   for bullet 101 against red   7 at time  637.64
       schedule fire     for blue  4 against red   7 at time  641.11
637.64 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 24
641.11 blue  4 fires BKE1    at red   7
       schedule impact   for bullet 101 against red   7 at time  642.11
       schedule fire     for blue  4 against red   7 at time  648.43
642.11 blue  4 (BKE1   ) hits red   7 but doesn't kill it.  rnd#= 25
648.43 blue  4 fires BKE1    at red   7
       schedule impact   for bullet 101 against red   7 at time  649.43
       schedule fire     for blue  4 against red   7 at time  659.92
649.43 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 26
659.92 blue  4 fires BKE1    at red   7
       schedule impact   for bullet 101 against red   7 at time  660.92
       schedule fire     for blue  4 against red   7 at time  678.05
660.92 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 27
678.05 blue  4 fires BKE1    at red   7
       schedule impact   for bullet 101 against red   7 at time  679.05
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       schedule fire      for blue  4 against red   7 at time  683.64
679.05 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 28
683.64 blue  4 fires BKE1     at red   7
       schedule impact    for bullet 101 against red   7 at time  684.64
       schedule fire      for blue  4 against red   7 at time  691.06
684.64 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 29
691.06 blue  4 fires BKE1     at red   7
       schedule impact    for bullet 101 against red   7 at time  692.06
       schedule fire      for blue  4 against red   7 at time  702.06
692.06 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 30
702.06 blue  4 fires BKE1     at red   7
       schedule impact    for bullet 101 against red   7 at time  703.06
       schedule fire      for blue  4 against red   7 at time  707.93
703.06 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 31
707.93 blue  4 fires BKE1     at red   7
       schedule impact    for bullet 101 against red   7 at time  708.93
       schedule fire      for blue  4 against red   7 at time  712.97
708.93 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 32
712.97 blue  4 fires BKE1     at red   7
       schedule impact    for bullet 101 against red   7 at time  713.97
       schedule fire      for blue  4 against red   7 at time  726.19
713.97 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 33
726.19 blue  4 fires BKE1     at red   7
       schedule impact    for bullet 101 against red   7 at time  727.19
       schedule fire      for blue  4 against red   7 at time  735.85
727.19 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 34
735.85 blue  4 fires BKE1     at red   7
       schedule impact    for bullet 101 against red   7 at time  736.85
       schedule fire      for blue  4 against red   7 at time  744.60
736.85 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 35
744.60 blue  4 fires BKE1     at red   7
       schedule impact    for bullet 101 against red   7 at time  745.60
       schedule fire      for blue  4 against red   7 at time  756.15
745.60 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 36
756.15 blue  4 fires BKE1     at red   7
       schedule impact    for bullet 101 against red   7 at time  757.15
       schedule fire      for blue  4 against red   7 at time  770.89
757.15 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 37
770.89 blue  4 fires BKE1     at red   7
       schedule impact    for bullet 101 against red   7 at time  771.89
       schedule fire      for blue  4 against red   7 at time  777.25
771.89 blue  4 (BKE1   ) misses   red   7 & loses round.   rnd#= 38
777.25 blue  4 fires BKE1     at red   7
       schedule impact    for bullet 101 against red   7 at time  778.25
       schedule fire      for blue  4 against red   7 at time  792.72
778.25 blue  4 (BKE1   )  k-kills red   7          range = 2021.78  rnd#= 39
778.25 blue  4 leaves red   7 after tgt is killed #dets=  1  1 #tgts= 1
       cancel fire     for blue  4 against red   7 at time  792.72
          status of combatants          average rounds
     |----blue-----|  |----red------|    used per sys      Seeds for next rep
 rep al mo fo mf  k  al mo fo mf  k      blue     red     general      LOS
   1  1  0  0  2  1   1  0  0  2  3     25.0     2.3    1223423358    1384844454
```

GROUNDWARS 6.52

INITIAL CONDITIONS:

Scenario: Red Attack
Terrain: Al Mafraq
Attack Distribution: Frontal

Atmospheric Conditions:
10.0 km. visibility
Pinpoint Restrictions: Only if p-infinity > 0

Replications: 1
Game range: 4000 meters
Max Time: 1050.0 seconds

Number	Unit Name	Vehicle Name	Weapon1 Name	Weapon2 Name	Weapon3 Name	Sensor Name
4	BTNK	BTNK	BKE1	NULL	NULL	BTNK
4	RTNK	RTNK	RKE1	RMI1	NULL	RTNK
2	RAPC	RAPC	RMI2	NULL	NULL	RTNK

RESULTS:

1.67 exchange ratio
1.00 surviving force ratio

*** Average Losses by Direct Fire ***

	Enemy	Friendly
Red Losses	5.00	.00
Blue Losses	3.00	.00

***** System Exchange Ratios *****
(vehicles killed per vehicle lost)

BTNK	1.67
RTNK	.50
RAPC	1.00

***** Killer - Victim Scoreboard (Kills) *****

Killers | Victims-->	BTNK	RTNK	RAPC	Total
BTNK	.00	4.00	1.00	5.00
RTNK	2.00	.00	.00	2.00
RAPC	1.00	.00	.00	1.00
Pr. Art	.00	.00	.00	
On-call	.00	.00	.00	
Total Killed ->	3.00	4.00	1.00	

Average Status of Combatants (Dead/Total)

	Alive	M-Dead	F-Dead	M&F-Dead	DEAD
BTNK	25.0	.0	.0	50.0	25.0
RTNK	.0	.0	.0	50.0	50.0
RAPC	50.0	.0	.0	.0	50.0

Losses as a Function of Time

Time Interval	RED Dead	BLUE Dead	Exchange Ratio
0- 60	.00	.00	.00
60- 120	.00	.00	.00
120- 180	.00	.00	.00
180- 240	.00	.00	.00
240- 300	1.00	.00	.00
300- 360	1.00	1.00	1.00

360-	420	1.00	1.00	1.00
420-	480	2.00	1.00	2.00
480-	540	2.00	1.00	2.00
540-	600	4.00	3.00	1.33
600-	660	4.00	3.00	1.33
660-	720	4.00	3.00	1.33
720-	780	5.00	3.00	1.67
780-	840	5.00	3.00	1.67
840-	900	5.00	3.00	1.67
900-	960	5.00	3.00	1.67
960-	1020	5.00	3.00	1.67
1020-	1080	5.00	3.00	1.67

****
********** BLUE Force Performance **********
****

******* Sensor Performance *******

TARGETS --> RTNK		RAPC		Total	
OBSERVERS|	Reg.	Pinp.	Reg.	Pinp.	Reg.	Pinp.
BTNK	10.0	.0	2.0	.0	12.0	.0
Totals	10.0	.0	2.0	.0	12.0	.0

******* Weapon Performance *******

******** SHOTS ********

TARGETS --> RTNK		RAPC	Total
BTNK	BKE1	81.0	19.0	100.0
BTNK		81.0	19.0	100.0
Totals		81.0	19.0	100.0

******** HITS ********

TARGETS --> RTNK		RAPC	Total
BTNK	BKE1	15.0	4.0	19.0
BTNK		15.0	4.0	19.0
Totals		15.0	4.0	19.0

******** KILLS ********

TARGETS --> RTNK		RAPC	Total
BTNK	BKE1	4.0	1.0	5.0
BTNK		4.0	1.0	5.0
Totals		4.0	1.0	5.0

****
********** RED Force Performance **********
****

******* Sensor Performance *******

TARGETS --> BTNK		Total	
OBSERVERS|	Reg.	Pinp.	Reg.	Pinp.

RTNK	.0	2.0	.0	2.0
RAPC	.0	3.0	.0	3.0
Totals	.0	5.0	.0	5.0

******* Weapon Performance *******

******** SHOTS ********

TARGETS --> BTNK		Total
RTNK	RKE1	.0	.0
RTNK	RMI1	4.0	4.0
RTNK		4.0	4.0
RAPC	RMI2	10.0	10.0
RAPC		10.0	10.0
Totals		14.0	14.0

******** HITS ********

TARGETS --> BTNK		Total
RTNK	RKE1	.0	.0
RTNK	RMI1	3.0	3.0
RTNK		3.0	3.0
RAPC	RMI2	3.0	3.0
RAPC		3.0	3.0
Totals		6.0	6.0

******** KILLS ********

TARGETS --> BTNK		Total
RTNK	RKE1	.0	.0
RTNK	RMI1	2.0	2.0
RTNK		2.0	2.0
RAPC	RMI2	1.0	1.0
RAPC		1.0	1.0
Totals		3.0	3.0

******* SENSOR PERFORMANCE BY RANGE ******

Unit: BTNK vs Unit: RTNK

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	1.00	1.00	.00
2500- 2999	2.00	2.00	.00
3000- 3499	3.00	3.00	.00
3500- 3999	4.00	4.00	.00
4000- 4499	.00	.00	.00

Unit: BTNK vs Unit: RAPC

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00

1500- 1999	.00	.00	.00
2000- 2499	.00	.00	.00
2500- 2999	2.00	2.00	.00
3000- 3499	.00	.00	.00
3500- 3999	.00	.00	.00
4000- 4499	.00	.00	.00

Unit: RTNK vs Unit: BTNK

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	1.00	.00	1.00
2500- 2999	.00	.00	.00
3000- 3499	1.00	.00	1.00
3500- 3999	.00	.00	.00
4000- 4499	.00	.00	.00

Unit: RAPC vs Unit: BTNK

Range Interval	Total	Regular	Pinpoint
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	.00	.00	.00
2500- 2999	3.00	.00	3.00
3000- 3499	.00	.00	.00
3500- 3999	.00	.00	.00
4000- 4499	.00	.00	.00

***** FOV SENSOR PERFORMANCE BY RANGE *****

Unit: BTNK

	Tgts Actually Acquired			Tgts W-Acq, N-Failed	
Range Interval	#	Avg W Time	Avg N Time	#	Avg W Time
0- 499	.00	.00	.00	.00	.00
500- 999	.00	.00	.00	.00	.00
1000- 1499	.00	.00	.00	.00	.00
1500- 1999	.00	.00	.00	.00	.00
2000- 2499	1.00	1.84	3.00	.00	.00
2500- 2999	4.00	21.33	3.00	.00	.00
3000- 3499	3.00	4.04	3.00	.00	.00
3500- 3999	4.00	11.82	3.00	.00	.00
4000- 4499	.00	.00	.00	.00	.00
Totals	12.00	12.21	3.00	.00	.00

******* WEAPON PERFORMANCE BY RANGE ******

Unit/Weap: BTNK /BKE1 vs Unit: RTNK

Range Interval	Shots	Hits	Kills	Range	P(hit)	P(k/h)	P(k/s)
0- 499	.00	.00	.00	500	.96	.87	.84

500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	26.00	5.00	2.00
2500- 2999	17.00	2.00	.00
3000- 3499	38.00	8.00	2.00
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
1000	.57	.66	.38
1500	.31	.54	.17
2000	.26	.54	.14
2500	.12	.49	.06
3000	.11	.48	.05
3500	.08	.44	.04
4000	.00	.00	.00

Unit/Weap: BTNK / vs Unit: RTNK

Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	26.00	5.00	2.00
2500- 2999	17.00	2.00	.00
3000- 3499	38.00	8.00	2.00
3500- 3999	.00	.00	.00

Unit/Weap: BTNK /BKE1 vs Unit: RAPC

Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	17.00	3.00	1.00
2500- 2999	2.00	1.00	.00
3000- 3499	.00	.00	.00
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.94	.87	.82
1000	.51	.66	.34
1500	.27	.54	.15
2000	.22	.54	.12
2500	.10	.49	.05
3000	.09	.48	.04
3500	.07	.44	.03
4000	.00	.00	.00

Unit/Weap: BTNK / vs Unit: RAPC

Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	17.00	3.00	1.00
2500- 2999	2.00	1.00	.00
3000- 3499	.00	.00	.00
3500- 3999	.00	.00	.00

Unit/Weap: RTNK /RMI1 vs Unit: BTNK

Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00
1000- 1499	.00	.00	.00
1500- 1999	.00	.00	.00
2000- 2499	1.00	1.00	1.00
2500- 2999	.00	.00	.00
3000- 3499	3.00	2.00	1.00
3500- 3999	.00	.00	.00

Range	P(hit)	P(k/h)	P(k/s)
500	.61	.59	.36
1000	.55	.59	.33
1500	.76	.66	.50
2000	.64	.66	.43
2500	.51	.59	.30
3000	.40	.55	.22
3500	.32	.52	.17
4000	.00	.00	.00

Unit/Weap: RTNK / vs Unit: BTNK

Range Interval	Shots	Hits	Kills
0- 499	.00	.00	.00
500- 999	.00	.00	.00

```
1000- 1499        .00      .00      .00
1500- 1999        .00      .00      .00
2000- 2499       1.00     1.00     1.00
2500- 2999        .00      .00      .00
3000- 3499       3.00     2.00     1.00
3500- 3999        .00      .00      .00
```

```
Unit/Weap: RAPC    /RMI2      vs Unit: BTNK
Range Interval |   Shots      Hits     Kills
      0-  499        .00       .00       .00
    500-  999        .00       .00       .00
   1000- 1499        .00       .00       .00
   1500- 1999        .00       .00       .00
   2000- 2499        .00       .00       .00
   2500- 2999      10.00      3.00      1.00
   3000- 3499        .00       .00       .00
   3500- 3999        .00       .00       .00
```

Range	P(hit)	P(k/h)	P(k/s)
500	.61	.59	.36
1000	.55	.59	.33
1500	.76	.66	.50
2000	.64	.66	.43
2500	.51	.59	.30
3000	.40	.55	.22
3500	.32	.52	.17
4000	.00	.00	.00

```
Unit/Weap: RAPC    /          vs Unit: BTNK
Range Interval |   Shots      Hits     Kills
      0-  499        .00       .00       .00
    500-  999        .00       .00       .00
   1000- 1499        .00       .00       .00
   1500- 1999        .00       .00       .00
   2000- 2499        .00       .00       .00
   2500- 2999      10.00      3.00      1.00
   3000- 3499        .00       .00       .00
   3500- 3999        .00       .00       .00

   24.40 blue rnds consumed per red unit killed
   38.33 red rnds consumed per blue unit killed

     .00 avg num times each blue unit scheds a delayed emg firing
     .00 avg num times each red  unit scheds a delayed emg firing

     .00 avg num times each blue unit fires a delayed emg round
     .00 avg num times each red  unit fires a delayed emg round

     .00 avg extra time each blue unit scheds a delayed emg firing
     .00 avg extra time each red  unit scheds a delayed emg firing

     .00 avg extra time each blue unit fires a delayed emg round
     .00 avg extra time each red  unit fires a delayed emg round

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7. Release Authority

The Groundwars Model is the property of the United States Government. The model may be released to any government agency which has a use for it. However, release to a government agency does not give authority for that agency to release the model to other agencies or contractors.

Contractors are permitted use of the model if a contract exists with the government which requires its use. Contractors are required to have their government point of contact provide this office with a letter of request. Upon receipt of this request, AMSAA will provide the contractor with a Memorandum of Agreement for the use and modification of the model. Upon execution of this agreement, AMSAA will provide the model to the government POC, who in turn provides it to the contractor.

Any modifications which are made to the model should be provided to this office. Any errors in the model should be addressed to one of the points of contact in the next section. Requests for the model should be sent to:

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